THOMAS P. GORDON
COUNTY EXECUTIVE

JOSEPH J. FREEBERY
GENERAL MANAGER

DEPARTMENT OF SPECIAL SERVICES

November 25, 1998

John Lovell
Pretreatment Coordinator
USEPA, Region III
841 Chestnut Building
Philadelphia, PA 19107-4431

RE: Pretreatment Program
NPDES No. DE 0050547
Middletown-Odessa-Townsend
Regional Wastewater Treatment Plant

Dear Mr. Lovell:

The following information is provided in order to complete the requirements for EPA acceptance of the New Castle County revision to local limits for the above referenced pretreatment program. The current limits, which were revised in 1990, were re-evaluated based on the information provided below.

(1) Description of Treatment Plant Unit Operations

Treatment consists of an influent screen, followed by an influent flow meter, two (2) partially mixed aerated lagoons, and one (1) polishing/storage lagoon designed to treat 1.7 million gallons of wastewater daily. Following storage, 500,000 gallons per day of the effluent will undergo flocculation, filtration, and disinfection prior to discharge to the Appoquinimink River. The remaining 1.2 million gallons per day will undergo disinfection prior to discharge to the land treatment system. A flow diagram of the treatment facility is provided on page 3 of NDPES Permit No. DE 0050547, located in Attachment A- "Water Quality Standards & Criteria."

The current flow to the treatment plant averages 0.5 mgd, of which approximately 0.016 mgd is generated by industrial users. Two categorical industries contribute wastewater to the MOT facility. No hauled waste is accepted at this facility. The industrial flow rate in Table C1, "Industrial Loadings" encompasses flows reported in self-monitoring reports during the three (3) year period for which data was collected. Due to production changes, the industrial flow over the last year is higher than the long term average, and was determined to be more indicative of future discharges to the plant. Therefore, the higher one (1) year value was used in submission calculations.

(2) Copy of NPDES Permit

A copy of the NPDES Permit No. DE 0050547 is included in Attachment A- "Water Quality Standards & Criteria." Effluent limitations are listed on page 4 of the permit.

(3) Rationale for Pollutant Selection

The list of pollutants selected is based on the current local limits, as no changes to permitted industrial effluent have occurred since the previous local limits submission.

187A OLD CHURCHMANS ROAD, NEW CASTLE, DE 19720 PHONE: 302-395-5700 FAX: 302-395-5787

Based on industrial and plant monitoring, the pollutants of concern are currently included in the local limits. The complete list of pollutants evaluated is presented in Attachment E- "MOT Local Limits Calculations" and Attachment F- "PRELIM V. 5.0 Data Sheets & Report."

The recently (November 1, 1998) revised NPDES permit for this facility includes the requirement for an annual priority pollutant analysis. These parameters are not expected to be present, however, if analytical results indicate otherwise, a local limits evaluation will be performed for the applicable parameters.

The priority pollutant scan performed on MOT influent in 1991 indicated no detectable pollutants, with the exception of trace amounts of bis 2-ethylhexyl phthalate, a common contaminant due to plastic sample tubing. Volatiles and pesticides analysis performed in 1992 also were below detectable limits.

(4) Description of Data Collection

Samples for the domestic contribution to the MOT influent were taken from the manhole behind Middletown Trailer Park. A summary of the residential analyses is located in Attachment B- "Residential/ Commercial Averages."

MOT influent samples were taken from the plant influent sample location, after screening and prior to lagoon #1. Plant effluent samples were collected at the outfall of the stream discharge location. Solids from the treatment process remain in the lagoons, therefore sludge disposal and sampling is not applicable to the local limits evaluation for this facility. Sampling dates and analytical results are summarized in Attachment D- "Removal Efficiency Data." The removal rate of -162% for zinc is consistent with monitoring data. We are studying interim lagoon zinc levels to determine the cause of the elevated zinc levels.

Data collection comprised twenty-four hour composite samples, collected for five sample days. EPA approved methods were used for all analyses. The detection limits used corresponded with the EPA approved methods and instrumentation used.

Mean removal efficiency calculations for the pollutants of concern are based on actual sampling data, except in cases where the calculated removal efficiencies appeared to be higher than the acceptable reference range. In these cases, a conservative estimate, based on reference removal efficiencies, was used. The referenced removal rates were obtained from Appendix L of the Guidance Manual for POTW Program Development, and from the "Focus on Toxic Chemicals" article (See Attachment G- "References").

Parameters for which treatment plant influent and effluent data is not currently available (cyanide, hexavalent chromium, silver, ammonia nitrogen, and phenols) will be scheduled for monitoring, and an addendum to this submission will be forwarded upon evaluation of these results. These parameters will also be included in the revisions to local ordinances.

(5) Sludge Disposal

Sludge disposal was not considered as a limiting factor in the local limits evaluation due to the nature of the treatment facility, as described above. Since less than five (5) percent

of the plant influent flow is from industrial discharges, solids collected in the lagoons are expected to be representative of typical domestic sludge, and therefore not limiting to disposal options. Additionally, the lagoons have been designed with a ten (10) year capacity for storage of solids. Due to the treatment process, EPA has removed the requirement for submission of a sludge inventory form for this facility.

(6) Water Quality Standards

The standards for effluent discharge used in the calculations included State of Delaware Water Quality Standards, February 1990; DRBC Effluent Quality Requirements, 1994; DNREC Regulations Governing the Control of Water Pollution, June 30, 1993; and, Safe Drinking Water Act MCLs, amended 1993. Additional data to calculate standards, including dilution factors and ambient hardness, was provided by DNREC. These values are the same as the previous submission for MOT, since the discharge point location has not changed. The Standards and Criteria used to calculate effluent limitations are summarized in Attachment A, Table A-1. The most stringent of the effluent limitations for each pollutant was used in the limit calculations.

(7) Process Inhibition

Due to the holding capacity and the treatment process of the lagoon system, process inhibition was not considered as a limiting factor in the evaluation. At design capacity, the system provides a holding time of greater than 63 days in the third lagoon, and a total system volume of more than 143 million gallons.

(8) Methodology Used to Derive Local Limits

Both manual (QuattroPro spreadsheets) and PRELIM calculations were used to derive local limits. A safety factor of 15% was used in all calculations. This value is within the recommended range according to your letter of February 3, 1998. The PRELIM data sheets and output report can be found in Attachment F. QuattroPro spreadsheet calculations, including formula sheets, are located in Attachment E.

Pollutant loading is allocated to industries on a uniform basis. Distribution of the pollutant loading in conjunction with the 15% safety factor should reasonably ensure that the maximum allowable headworks loadings will not be exceeded. Consistent with current practice, the revised local limits will be adopted as part of the Industrial Pretreatment Regulations (amended September 18, 1996), and variances, when appropriate, will be issued as terms of individual permits.

The attached Table 1 "Proposed Local Limits for the Middletown-Odessa-Townsend Regional Wastewater Treatment Plant" summarizes the proposed local limits based on manual and PRELIM calculations, in comparison to existing limits. As can be seen in this table, the local limit for PCBs will be eliminated, and PCB discharges prohibited, with the exception of a case by case review. Additionally, aluminum, beryllium, molybedenum, selenium, and thallium are proposed to be removed from the list of local limits since these parameters are not discharged by industrial users, and are not domestic pollutants of concern. Further, domestic, influent, and effluent analytical results for beryllium, selenium, and thallium are below detection limits.

Ammonia and phenols limits will remain at current levels for sewer safety, and plant analytical results will be included with the addendum to this submission. Hexavalent chromium, cyanide, and silver limits will also remain at current levels until further analysis of plant influent and effluent is completed. This analysis is scheduled for the week of November 30, and will be summarized in the addendum.

The proposed limits for total chromium, BOD, and TSS will remain at current levels. The proposed limits for arsenic, cadmium, mercury, and zinc are more stringent than current limits. Limits proposed for copper, lead, and nickel are less stringent than current limits.

The revised submission is enclosed for your acceptance. Should you have any questions or require further information on the above, please contact me at 302-395-5732.

Very truly yours,

J. B. Asthana, Ph.D., P.E.
Chief of Environmental Engineering

cc: Joseph J. Freebery, NCC
Paul Janiga, DE DNREC
Kenneth Branner, Town of Middletown

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TABLE 1 **Proposed Local Limits for the Middletown-Odessa-Townsend Regional Wastewater Treatment Plant**

Pollutant	PRELIM5 Limit (mg/L)	Calculated Limit (mg/L)	Proposed Limit (mg/L)	Current Limit (mg/L)
Aluminum	N/A	N/A	N/A	1.50
Ammonia Nitrogen	N/A	N/A	35.00*	35.00
Arsenic	0.84	0.84	0.80	1.00
Beryllium	N/A	N/A	N/A	0.007
BOD	N/A	N/A	350	350
Cadmium	0.00	0.01	0.01	0.02 0.015
Chromium (T)	162.94	162.94	1.50	1.50
Chromium, hex	0.51	0.53	0.50*	0.50
Copper	0.50	0.55	0.50	0.15
Cyanide	0.66	0.67	0.30*	0.30
Lead	1.19	1.19	1.15	0.50
Mercury	0.0002	0.0002	0.0002	0.001
Phenols	N/A	N/A	10.00*	10.00
Nickel	0.28	0.28	0.25	0.02
PCBs	N/A	N/A	N/A No discharge	0.0001
Selenium	N/A	N/A	N/A	0.25
Silver	N/A	N/A	0.015* 0.035	0.015
Thallium	N/A	N/A	N/A	5.00
TSS	N/A	N/A	500	500
Zinc	0.72	0.72	0.70	1.00

*These limits will remain at current levels, pending further analysis of influent and effluent.

ATTACHMENTS
FOR
NEW CASTLE COUNTY, DELAWARE
PRETREATMENT PROGRAM

REVISIONS TO
LOCAL LIMITS

ATTACHMENT A:

WATER QUALITY

STANDARDS & CRITERIA

TABLE A1 STANDARDS & CRITERIA

Pollutant of Concern	Fish Ingestion (mg/L)(1)	Fresh Acute (mg/L)(2)	Fresh Chronic (mg/L)(2)	Chronic * 7.6 (mg/L)(2)	DRBC (mg/L)(3)	DNREC (mg/L)(4)	SDWA (mg/L)(5)
Ag	40	0.023	0.00012	**0.000912**	0.05	0.1	0.05
Al	N/A	0.75	0.087	**0.6612**			N/A
As	N/A	0.36	0.19	1.444	0.1		**0.05**
Be	3.5						**0.004**
Cd	N/A	0.0123	0.0025	0.019	0.02	0.1	**0.01**
Cr(VI)	4.2	**0.016**	0.011	0.0836	0.1	0.15	0.05
Cr(T)	N/A	**4**	0.672	5.1072			
Cu	N/A	**0.046**	0.04	0.304	0.2	0.5	1
CN	270	**0.022**	0.0052	0.03952		0.05	0.2
Fe	N/A	N/A	1	7.6		**2**	N/A
Pb	N/A	0.3	0.02	0.152	0.1	0.15	**0.05**
Hg	0.0071	0.0024	1.2E-05	**9.12E-05**	0.01	0.005	0.002
Mo	N/A						N/A
Ni	5.7	3.34	0.532	4.0432		1	**0.1**
PCBs	**5.6E-08**	0.002	1.4E-05	0.0001064			0.0005
Phenolics							N/A
Se	1.1	0.02	0.005	0.038	0.02	0.02	**0.01**
Th	0.06		N/A				**0.002**
Zn	N/A	**0.276**	0.358	2.7208	0.6	1	5

Bold indicates most stringent limitation for each pollutant

1) Limits from State of Delaware Water Quality Standards, Table 2, February 1990
2) Limits from State of Delaware Water Quality Standards, Table 1, February 1990. No dilution used for acute; 7.6:1 used for chronic. Ambient hardness = 275 for acute; 471 for chronic
3) Effluent Quality Requirements, 1994
4) "Regulations Governing the Control of Water Pollution" as amended June 30, 1993
5) MCLs

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State Permit Number WPCC 3185D/75
NPDES Permit Number DE 0050547
Effective Date: November 1, 1998
Expiration Date: October 31, 2003

AUTHORIZATION TO DISCHARGE UNDER THE

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

AND THE LAWS OF THE

STATE OF DELAWARE

In compliance with the provisions of the Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977 (33 U.S.C. 1251 et seq.) (hereinafter referred to as "the Act"), and pursuant to the provisions of 7 Del. C., 6003

New Castle County
Department of Public Works
100 Churchmans Road
New Castle, Delaware 19720

is authorized to discharge from the facility (Point Source 001) located at

County Road #424 Near Odessa, Delaware
Appoquinimink Hundred, New Castle County
Middletown-Odessa-Townsend Regional Wastewater Treatment Plant

to receiving waters named

Appoquinimink River which enters the Delaware River in Zone 5.

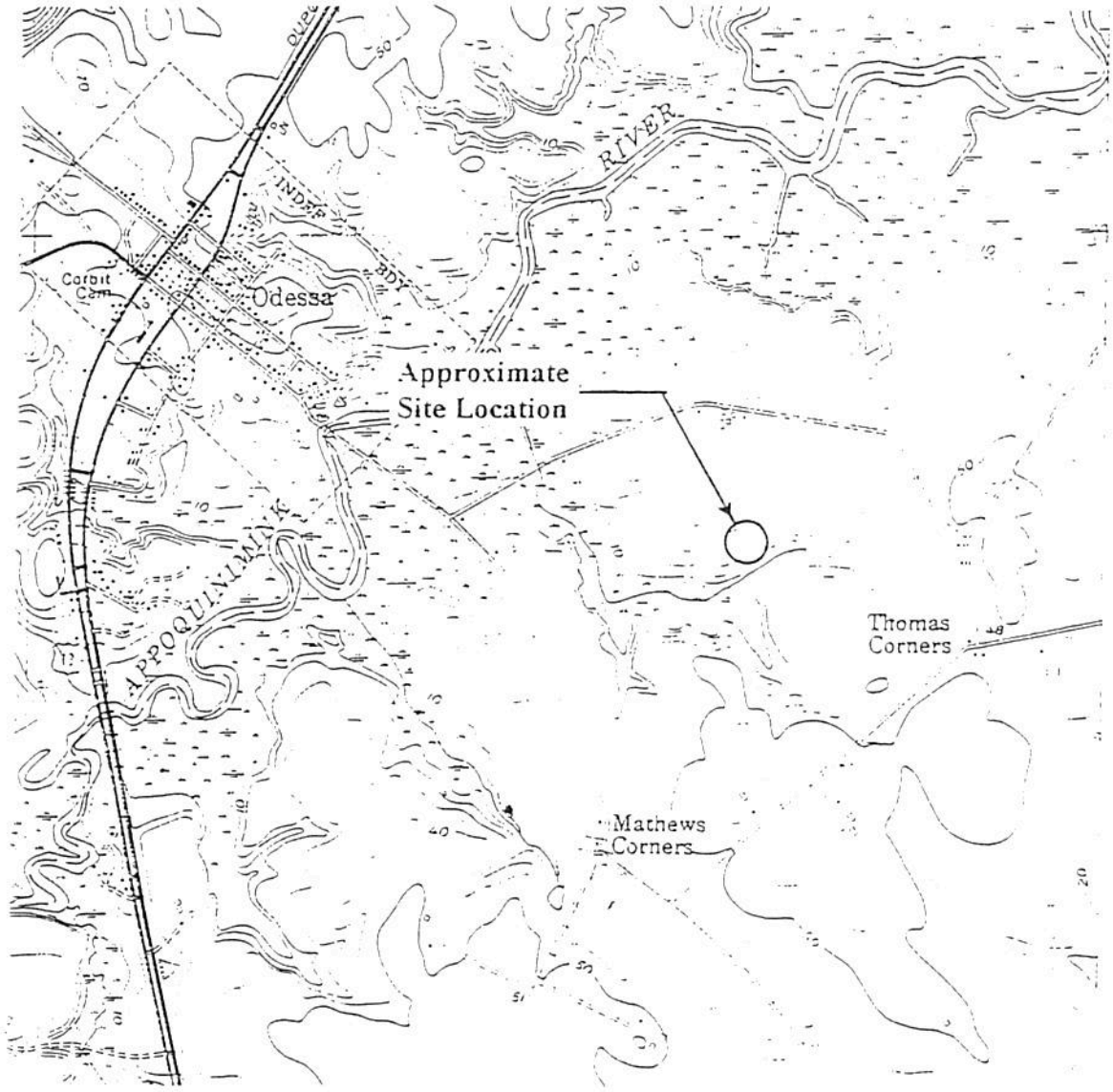
The effluent limitations, monitoring requirements and other permit conditions are set forth in Part I, II and III hereof.

R. Peder Hansen, P.E., P.G.
Surface Water Discharges Section
Division of Water Resources
Department of Natural Resources
and Environmental Control

September 29 1998
Date Signed

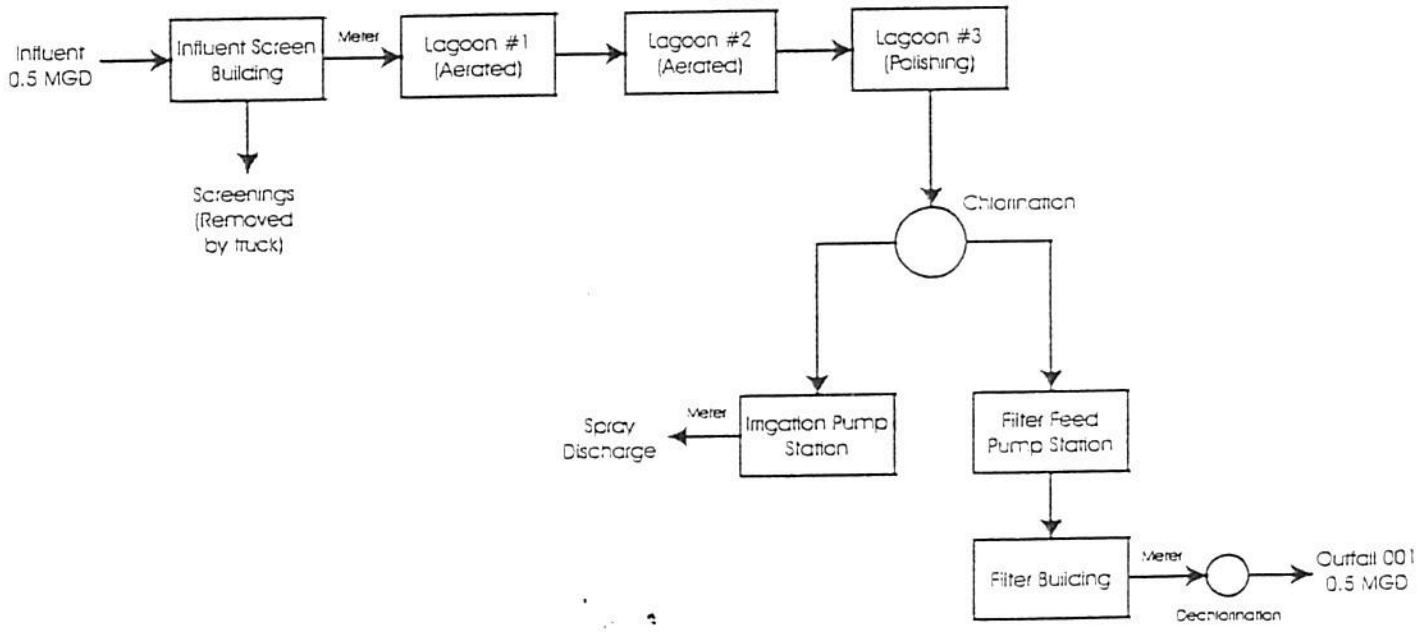
A.1. General Description of Discharges and Facilities

Outfall 001 - Discharge of treated sanitary and industrial wastewater.



Site Location Map

A.2 General Description of Discharges and Facilities (continued)



Process Diagram

B.1. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning effective date and lasting through expiration date, the permittee is authorized to discharge from point source 001[1] the quantity and quality of effluent specified below:

Parameter	Effluent Limitations						Monitoring Requirements[2]	
	Load			Concentration			Measurement Frequency	Sample Type
	Daily Average	Daily Maximum	Units	Daily Average	Daily Maximum	Units		
Flow[3]	0.5		mgd				Continuous	Record/ Totalize
Total Residual Chlorine	None detectable[4]						Once daily	Grab
$CBOD_5$	34.8	52.2	lbs/day			mg/L	Once weekly	Composite
TSS	62.6	96.0	lbs/day	15.0	23.0	mg/L	Once weekly	Composite
Lead	0.6	1.0	lbs/day	0.15	0.23	mg/L	Once weekly	Composite
Total Phosphorus (as P)	2.1	4.2	lbs/day			mg/L	Once weekly	Composite
Total Kjeldahl Nitrogen (TKN), as N	Moving 12-Month Cumulative Average Load of 3,796 pounds[5]						Once weekly	Composite
TKN, as N, (May - Sept.)	10.4	15.6	lbs/day			mg/L		
TKN, as N, (Oct. - April)			lbs/day			mg/L		
Fecal Coliform				200		col/ 100 mL	Once weekly	Grab
Enterococcus						col/ 100 mL	Once monthly	Grab
pH	The pH shall be between 6.0 S.U. and 9.0 S.U. at all times.					S.U.	Once daily	Grab
Biomonitoring							Once per year[6]	Composite
The discharge shall be free from floating solids, sludge deposits, debris, oil and scum.								

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location: At discharge from treatment plant after disinfection.

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1 See Discharge Description on page 2 of 22 pages of this permit.

2 Report "nondetected" testing results on the discharge monitoring report (DMR) as "<" and the applicable test MDL. For example, if acrylonitrile is "nondetected" using a test method with an MDL of 10 ug/L, report "< 10 ug/L" on the DMR.

3 Report both average daily and maximum daily flows on the discharge monitoring report (DMR).

4 See Special Condition No. 9.

5 See Special Condition No. 10.

6 The permittee shall conduct biomonitoring tests in accordance with Special Conditions No. 11 of this permit.

C. SCHEDULE OF COMPLIANCE

1. The permittee shall comply with requirements as soon as possible, but in no event later than the dates set forth in the following schedule:

   None

2. No later than 14 calendar days following a date identified in the above schedule of compliance, the permittee shall submit either a report of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

D. Monitoring and Reporting

1. Representative Sampling

   Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge.

2. Reporting

   Monitoring results obtained during the previous one (1) month shall be summarized for each month and reported on a Discharge Monitoring Report Form ("DMR", EPA Form No. 3320-1), postmarked no later than the 28th day of the month following the completed reporting period. Electronically-generated DMR forms may be used, if approved by the Department in writing. Signed copies of these, and all other reports required herein, shall be submitted to the State at the following address:

   DELAWARE DEPT. OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL, DIVISION OF WATER RESOURCES, SURFACE WATER DISCHARGES SECTION, 89 KINGS HIGHWAY, DOVER, DELAWARE 19901. TELEPHONE: (302) 739-5731

3. Definitions

   a. Bypass - The intentional diversion of wastes from any portion of a treatment facility.

   b. Composite sample - A combination of individual samples obtained at intervals over a time period. Either the volume of each individual sample is proportional to discharge flow rates or the sampling interval (for constant volume samples) is proportional to the flow rates over the time period used to produce the composite. For a continuous discharge, a minimum of 24 individual grab samples shall be collected and combined to constitute a 24 hour composite sample. For intermittent discharges of 4-8 hours duration, a minimum of 12 grab samples shall be collected and combined to constitute the composite sample for the discharge. For intermittent discharges of less than 4 hours, a minimum of individual grab samples shall be collected and combined to constitute the composite sample equal to the duration of the discharge in hours times 3 but not less than 3 samples.

c. Daily average discharge - The total discharge by weight during a calendar month divided by the number of days in the month that the production or commercial facility was operating. Where less than daily sampling is required by this permit, the daily average discharge shall be determined by the summation of all the measured daily discharges by weight divided by the number of days during the calendar month when the measurements were made.

d. Daily maximum discharge - The total discharge by weight during any calendar day.

e. Daily maximum temperature - The highest arithmetic mean of the temperature observed for any two (2) consecutive hours during a 24-hour day, or during the operating day if flows are of shorter duration.

f. Estimate - To be based on a technical evaluation of the sources contributing to the discharge including, but not limited to, pump capabilities, water meters and batch discharge volumes.

g. Grab sample - An individual sample collected in less than 15 minutes.

h. I/S (immersion stabilization) - A calibrated device is immersed in the effluent stream until the reading is stabilized.

i. Maximum instantaneous concentration - The concentration of a pollutant in terms of milligrams per liter which represents the value obtained from a grab sample of an effluent. The maximum instantaneous concentration shall be based on a review of the degree of fluctuation experienced in comparable systems. For purposes of compliance, the maximum instantaneous concentration shall be based on the actual analysis of the grab sample.

j. Measured flow - Any method of liquid volume measurement the accuracy of which has been previously demonstrated in engineering practice, or for which a relationship to absolute volume has been obtained.

k. Monthly average temperature - The arithmetic mean of temperature measurements made on an hourly basis, or the mean value plot of the record of a continuous automated temperature recording instrument, either during a calendar month, or during the operating month if flows are of shorter duration.

l. Noncontact cooling water - Waters used for cooling which does not come into direct contact with any raw material, intermediate product, waste product, or finished product.

m. Upset - An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance or careless or improper operation.

4. Test Procedures

Test procedures for the analysis of pollutants shall conform to the applicable test procedures identified in 40 C.F.R., Part 136, unless otherwise specified in this permit.

5. Quality Assurance Practices

The permittee is required to show the validity of all data by requiring its laboratory to adhere to the following minimum quality assurance practices:

a. Duplicate[1] and spiked[2] samples must be run for each constituent in the permit on 5% of the samples, or at least on one sample per month, whichever is greater. If the analysis frequency is less than one sample per month, duplicate and/or spiked samples must be run for each analysis.

b. For spiked samples, a known amount of each constituent is to be added to the discharge sample. The amount of constituent added should be approximately the same amount present in the unspiked sample, or must be approximately that stated as maximum or average in the discharge permit.

c. The data obtained in a and b shall be summarized in an annual report in terms of precision, percent recovery, and the number of duplicate and spiked samples run, date and laboratory log no. of samples run, and name of analyst. The report shall cover the calendar year, January 1 through December 31, and shall be submitted to the Department, postmarked no later than the February 15 following the fourth quarter of reporting.

d. Precision shall be calculated by the formula, standard deviation $s = (\Sigma d'/k)^{1/2}$, where d is the difference between duplicate results, and k is the number of duplicate pairs used in the calculations.

e. Percent recovery shall be reported on the basis of the formula $R = 100\ (F-I)/A$, where F is the analytical result of the spiked sample, I is the result before spiking of the sample, and A is the amount of constituent added to the sample.

f. The percent recovery, R, in e above shall be summarized yearly in terms of mean recovery and standard deviation from the mean. The formula, $s = (\Sigma(x-\bar{x})^2/(n-1))^{1/2}$, where s is the standard deviation around the mean $\bar{x}$, x is an individual recovery value, and n is the number of data points, shall be applied.

g. The permittee or his contract laboratory is required to annually analyze an external quality control reference sample for each pollutant. These are available through the EPA regional quality assurance coordinator. Results shall be included in the Annual Report, require in paragraph c above.

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1 Duplicate samples are not required for the following parameters: color, temperature, and turbidity.

2 Spiked samples are not required for the following parameters: acidity, alkalinity, bacteriological, benzidine, chlorine, color, dissolved oxygen, hardness, pH, oil & grease, radiological, residues, temperature, turbidity, BOD_5, and total suspended solids. Procedures for spiking samples are available through the Regional Quality Assurance Coordinator.

h. The permittee and/or his contract laboratory is required to maintain an up-to-date and continuous record of the method used, of any deviations from the method or options employed in the reference method, of reagent standardization, of equipment calibration and of the data obtained in a, b and f above.

i. If a contract laboratory is utilized, the permittee shall report the name and address of the laboratory and the parameters analyzed together with the monitoring data required.

6. Records

a. For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

(1) The date, exact place and time of sampling or measurements;

(2) The person(s) who performed the sampling or measurements;

(3) The dates analyses were performed;

(4) The person(s) who performed each analysis;

(5) The analytical techniques or methods used;

(6) The results of each analysis; and

(7) The quality assurance information as stated above.

b. An operator log must be kept on site at all times. This log should include time spent at the treatment facility on any date, and the nature of operation and maintenance performed.

7. Additional Monitoring by Permittee

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report Form (EPA No. 3320-1). Such increased frequency shall also be indicated.

8. Records Retention

All records and information resulting from the monitoring activities required by this permit including hard copies of any electronically generated Discharge Monitoring Reports, all records of analyses performed, records of calibration and maintenance of instrumentation, and recording from continuous monitoring instrumentation shall be retained for three (3) years. This period of retention shall be extended automatically during the course of any unresolved litigation regarding the regulated activity or regarding control standards applicable to the permittee, or as requested by the Department.

A. MANAGEMENT REQUIREMENTS

1. Duty to Comply

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant more frequently than, or at a level in excess of, that identified and authorized herein shall constitute a violation of this permit. The violation of any effluent limitation or of any other condition specified in this permit shall be grounds for enforcement as provided in 7 Del.C. §6005; for loss of authorization to discharge pursuant to this permit; for permit revocation and reissuance or modification pursuant to Part II.B.5.; or for denial of a permit renewal application. Pursuant to 7 Del.C. §6019, the Department may seek voluntary compliance by way of warning, notice or other educational means. However, the law does not require that such voluntary means be used before proceeding by way of compulsory enforcement.

2. Notification

a. Planned Changes

The permittee shall notify the Department in writing as soon as possible of any anticipated expansion or alteration of the permitted facility, any production increases, process modifications, or other changes which could result in new, different or increased discharges of pollutants. Notice is required only when such alteration, addition or change

(1) may justify the application of permit conditions that are different from those specified in this permit, or

(2) may justify the application of permit conditions that are absent from the permit, or

(3) meets any one of the following criteria:

(a) The alteration or addition to the permitted facility may meet one of the criteria for determining whether a facility is a new source; or

(b) As a result of the alteration or addition, the nature of the discharge is or could be substantially different from that represented in the application originally submitted for the discharge, upon which this permit is based; or

(c) The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, including any uses or disposal sites not identified in the permit application or during the permit issuance process; or

(d) The planned change in permitted facility or activity may result in noncompliance with the requirements of this permit.

Upon notification of a planned change, the Department may require the submission of a new application. The permittee is encouraged to notify the Department and submit any application well in advance of the scheduled date for the anticipated alteration or addition to

allow sufficient time to process any modifications of the permit necessitated by the change and to avoid any resultant project delays.

b. Noncompliance Notification

(1) If, for any reason, the permittee does not comply with or will be unable to comply with any daily maximum effluent limitations or maximum instantaneous concentration specified in this permit, the permittee shall provide the Department with the following information, in writing, within five (5) days of becoming aware of such conditions:

(a) A description of the discharge and cause of noncompliance;

(b) The period of noncompliance, including exact dates and times and the anticipated time when the discharge will return to compliance; and

(c) Steps being taken to reduce, eliminate, and prevent recurrence of the noncomplying discharge.

(2) In the case of any upset or discharge subject to any toxic pollutant effluent standard under Section 307(a) of the Act, the Department shall be notified within 24 hours of the time the permittee becomes aware of the noncomplying discharge. Notification shall include information as described in paragraph 2.b.(1) above. If such notification is made orally, a written submission must follow within five (5) days of the time the permittee becomes aware of the noncomplying discharge.

3. Facilities Operation

The permittee shall at all times maintain in good working order and operate as efficiently as possible all collection and treatment facilities and systems (and related appurtenances) installed or used by the permittee to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance includes, but is not limited to, effective performance based on designed facility removals, adequate funding, effective management, adequate operator staffing and training and adequate laboratory and process controls including appropriate quality assurance procedures.

4. Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact to the waters of the State or the United States resulting from noncompliance with this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

5. Bypassing

Any bypass of treatment facilities necessary to maintain compliance with the terms and conditions of this permit is prohibited unless:

a. The bypass is necessary to perform essential maintenance and auxiliary equipment, a redundant system, a back-up system, or an alternate mode of operation is utilized to maintain treatment performance, or

b. The bypass meets the following three conditions:

(1) The bypass is unavoidable to prevent loss of life, personal injury or severe property damage; and

(2) There are no feasible alternatives; and

(3) The bypass is allowed under conditions determined by the Department to be necessary to minimize adverse effect as provided under 7 Del. C., Chapter 60, §6011.

For any bypassing, the permittee shall provide an oral report to the Department within 24 hours of the permittee's becoming aware of the bypass. An oral report shall be followed by a written report within five (5) days of the permittee's becoming aware of the bypass. Where the need for a bypass is known (or should have been known) in advance, this written notification shall be submitted to the Department for approval at least ten (10) days before the date of bypass. The Department may waive the written report on a case-by-case basis if the oral report has been received within 24 hours. The Department may also waive oral and written reports on a case-by-case basis if the bypass is unprohibited.

6. Conditions Necessary for Demonstration of an Upset

An upset shall constitute an affirmative defense to an action brought for noncompliance with technology-based effluent limitations only if the permittee demonstrates, through properly signed contemporaneous operating logs, or other relevant evidence, that:

a. An upset occurred and that the permittee can identify the specific cause(s) of the upset; and

b. The permitted facility was at the time being operated in a prudent and workman-like manner and in compliance with proper operation and maintenance procedures; and

c. The permittee submitted a notification of the upset as required by Part II, A.2.b.

d. The permittee has taken all reasonable remedial measures required to minimize adverse impact.

7. Removed Substances

Solids, sludges, filter backwash, or other pollutants removed in the course of collection or treatment of waste waters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering surface waters or ground waters.

8. Failure

The permittee, in order to maintain compliance with its permit, shall control production and all discharges upon reduction, loss or failure of the treatment facility until the facility is restored or an alternative method of treatment is provided.

9. Alternative Power Source

In order to insure compliance with the effluent limitations and all other terms and conditions of this permit, the Department may require that the permittee shall provide an alternative power sufficient to operate the wastewater collection and treatment facilities in accordance with the Schedule of Compliance contained in Part I of this permit.

B. RESPONSIBILITY

1. Right of Entry

The permittee shall allow the Secretary of the Department of Natural Resources and Environmental Control, the Regional Administrator, and their authorized representatives, jointly and severally, upon the presentation of credentials and such other documents as may be required by law:

a. To enter upon the permittee's premises where a point source is located or where any records are required to be kept under the terms and conditions of this permit; and

b. At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect any monitoring equipment or monitoring method required in this permit; to inspect any collection, treatment, pollution management, or discharge facilities required under this permit; and to sample any discharge of pollutants.

2. Transfer of Ownership and Control

In the event of any change in ownership or control of facilities from which the authorized discharge emanates, the permit may be transferred to another person if the permittee:

a. Notifies the Department, in writing, of the proposed transfer; and

b. A written agreement between the transferor and the transferee, indicating the specific date of proposed transfer of permit coverage and acknowledging responsibilities of current and new permittees for compliance with and liability for the terms and conditions of this permit, is submitted to the Department; and

c. The Department within thirty (30) days of receipt of the notification of the proposed transfer does not notify the current permittee and the new permittee of intent to modify, revoke and reissue, or terminate the permit and require that a new application be submitted.

3. Reapplication for a Permit

At least 180 days before the expiration date of this permit, the permittee shall submit a new application for a permit or notify the Department of the intent to cease discharging by the expiration date. In the event that a timely and sufficient reapplication has been submitted and the Department is unable, through no fault of the permittee, to issue a new permit before the expiration date of this permit, the terms and conditions of this permit are automatically continued and remain fully effective and enforceable.

4. Availability of Reports

Except for data determined to be confidential under Section 308 of the Act, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Department of Natural Resources and Environmental Control. As required by the Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for under 7 Del. C., 6013.

5. Permit Modification, Revocation and Reissuance and Termination

a. After notice and opportunity for a hearing, this permit may be modified, terminated, or revoked and reissued in whole or in part during its term for cause including, but not limited to, the following:

(1) Violation of any terms or conditions of this permit;

(2) Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts;

(3) A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge; or

(4) Information that the permitted discharge poses a threat to human health or welfare.

b. In addition to the provisions of paragraph 5.a. above, this permit may be modified, revoked and reissued in whole or in part, but not terminated, after notice and opportunity for a hearing, for cause including, but not limited to, the following:

(1) Material and substantial alterations or additions to the discharger's operation which were not covered in the effective permit provided that such alterations do not constitute total replacement of the process or production equipment causing the discharge which converts it into a new source;

(2) The existence of a factor or factors which, if properly and timely brought to the attention of the Department, would have justified the application of limitations or other requirements different from those required by applicable standards or limitations but only if the requestor shows that such factor or factors arose after the final permit was issued;

(3) Revision, withdrawal or modification of State water quality standards or Environmental Protection Agency promulgated effluent limitations guidelines, but only when:

(a) The permit term or condition requested to be modified or revoked was based on a promulgated effluent limitations guideline or an Environmental Protection Agency approved State water quality standards.

(b) The U.S. Environmental Protection Agency has:

i) Revised, withdrawn or modified that portion of the effluent limitations guidelines on which the permit term or condition was based; or

ii) Approved a State action with regard to a water quality standard on which the permit term or condition was based; and

(c) A request for modification or revocation and reissuance is filed within ninety (90) days after Federal Register notice indicating:

i) Revision, withdrawal or modification of that portion of the effluent limitations guidelines; or

ii) The U.S. Environmental Protection Agency approval of State action regarding a water quality standard;

(4) Judicial remand of Environmental Protection Agency promulgated effluent limitations guidelines, if the remand concerns that portion of the guidelines on which the permit term or condition was based and the request is filed within ninety (90) days of the judicial remand;

(5) Any modification or revocation and reissuance of permits specifically authorized by the Act;

(6) To comply with any applicable standard or limitation promulgated or approved under sections 301(b) (2) (C) and (D), 304 (b) (2) and 307 (a) (2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:

(a) Contains different conditions or is otherwise more stringent than any effluent limitations in the permit; or

(b) Controls any pollutant not limited in the permit.

The permit as modified or reissued under this paragraph shall also contain any other requirements of the Act then applicable.

(7) To contain a schedule of compliance leading to termination of the direct discharge by a date which is no later than the statutory deadline;

(8) To modify a schedule of compliance in an issued permit for good and valid cause by a date which is no later than the statutory deadline.

(9) To modify a schedule of compliance of a POTW which has received a grant, under section 202(a) (3) of the Act, to reflect the amount of time lost during construction of the innovative and alternative facilities by a date which is no later than the statutory deadline.

6. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under 7 Del. C., Chapter 60.

7. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation.

8. Discharge of Pollutants

Any person who causes or contributes to the discharge of a pollutant into waters of the State or the United States either in excess of any conditions specified in this permit or in absence of a specific permit condition shall report such an incident to the Department as required under 7 Del. C., 6028.

9. Property Rights

The issuance of this permit neither conveys any property rights in either real or personal property, or any exclusive privileges, nor authorizes any injury to private property or any invasion of personal rights, or any infringement of Federal, State or local laws or regulations.

10. Construction Authorizations

This permit does not authorize or approve the construction of any onshore or offshore physical structures or facilities or the undertaking of any work in any navigable waters.

11. Severability

The provisions of this permit are severable. If any provision of this permit is held invalid, the remainder of this permit shall not be affected. If the application of any provision of this permit to any circumstance is held invalid, its application to other circumstances shall not be affected.

A. Special Conditions

1. This permit supersedes NPDES Permit DE 0050547, and State Permit WPCC 3185C/75, issued on November 9, 1992.

2. The permittee, a publicly owned treatment plant (hereinafter referred to as a POTW), shall:

   a. The permittee shall operate and implement an industrial pretreatment program in accordance with the federal Clean Water Act, applicable State laws, and the federal General Pretreatment Regulations at 40 CFR 403. The program shall also be implemented in accordance with the pretreatment program and any modifications thereto submitted by the permittee and approved by the Approval Authority.

   b. The permittee shall submit an Annual Report by February 28 of each year to the Department and EPA that describes the permittee's pretreatment activities for the previous calendar year. The Annual Report shall include a description of pretreatment activities in all municipalities from which wastewater is received at the permittee's POTW(s), and contain the following information:

      i. Industrial Listing - The Annual Report shall contain an updated industrial listing showing all current Significant Industrial Users (SIUs) and the categorical standard, if any, applicable to each;

      ii. Control Mechanism Issuance - The Annual Report shall contain a summary of SIU control mechanism issuance, including a list of issuance and expiration dates for each SIU.

      iii. Sampling and Inspection - The Annual Report shall contain a summary of the number of inspections and samplings of each SIU by the permittee, as well as the number of self-monitoring events conducted by each SIU. The summary shall include a list of all SIUs either not sampled or not inspected by the permittee, and the reason that the sampling and/or inspection was not conducted;

      iv. Industrial User (IU) Compliance and POTW Enforcement - The Annual Report shall contain a summary of the number and type of violations of pretreatment standards and requirements, including local limits, and the actions taken by the permittee to obtain compliance, including civil penalty assessments and actions for injunctive relief. The report shall state whether each IU was in significant noncompliance, as that term is defined in 40 CFR Section 403.8(f)(2)(vii);

      v. Summary of POTW Operations - The Annual Report shall contain a summary of any interference, pass-through, or permit violations by the POTW which may be attributed to industrial users, and actions taken to address these events. The summary shall also include sampling and analysis of treatment plant influent, effluent, and sludge for toxic and incompatible pollutants, and an analysis of any trends in such data for the last three years;

vi. Pretreatment Program Changes - The Annual Report shall contain a summary of any changes to the approved program and the date of submission to the Approval Authority;

c. Monitoring - The permittee shall conduct monitoring at its treatment plant that, at a minimum, includes quarterly influent, effluent, and sludge analysis for all local limit parameters, and an annual priority pollutant scan for influent and sludge.

d. Notification of Pass-Through or Interference - The permittee shall notify EPA and the Department, in writing, of any instance of pass-through or interference related to an industrial discharge from an IU into the POTW. The notification shall be attached to the Discharge Monitoring Report submitted to the Department and EPA and shall describe the incident, including the date, time, length, cause (including responsible user if known), and the steps taken by the permittee and the IU (if identified) to address the incident. A copy of the notification shall also be sent to the EPA at the address provided below.

e. Headworks Analysis - The permittee shall revise its local limits reevaluation based on the February 3, 1998 comments on its October 1, 1997 local limits submission within 3 months of the issuance of this permit. Within 4 months of acceptance of the headworks analysis by the Approval Authority, the permittee shall adopt the revised local limits and notify all contributing municipalities of the need to adopt the revised local limits.

f. Changes to Pretreatment Program - The Department and EPA may require the permittee to submit for approval changes to its pretreatment program if any one or more of the following conditions is present:

i. The program is not implemented in accordance with 40 CFR Part 403;

ii. Problems such as interference, pass-through, or sludge contamination develop or continue;

iii. Federal, State, or local requirements change;

iv. Changes are needed to assure protection of waters of the State.

g. Correspondence - The Approval Authority shall be EPA at the following address:

Pretreatment Coordinator (3WP24)
U.S. Environmental Protection Agency
1650 Arch Street
Philadelphia, PA 19103-2029

Copies of all correspondence and reports dealing with this program shall be sent to:

Delaware Dept. of Natural Resources and Environmental Control, Division of Water Resources, Surface Water Discharges Section, 89 Kings Highway, Dover, Delaware 19901

3. The Delaware River Basin Commission (DRBC) allocation of 50.1 pounds per day of carbonaceous first stage oxygen demand (FSOD), equivalent to a daily average of 41.7 pounds of BOD_5, or 34.8 pounds of $CBOD_5$, shall not be exceeded. The raw waste BOD_5 shall be reduced by at least 87.5% as a monthly average prior to discharge. However, when the effluent is 5 mg/L or less, the permittee will not be required to meet the 87.5 percent reduction of raw waste BOD_5.

4. The waste water treatment facility constructed in accordance with State Permit WPCC 3005/93, for which the final effluent limits for Outfall 001 contained herein are issued, is a Class III facility. The permittee shall retain the services of a Delaware certified wastewater treatment plant operator for the operation and maintenance of the facility. The operator shall, at a minimum, be licensed at the level necessary to comply with the "State of Delaware Regulations for Licensing Operators of Wastewater Facilities, as revised."

5. The permittee shall comply with all existing Federal and State laws and regulations that apply to its sludge use or disposal practice(s) including, but not limited to, Federal Regulations 40 CFR Part 258, Section 28 "Liquids Restrictions" and the Department's Guidance and Regulations Governing the Land Treatment of Wastes, August 1988. If the Department determines that additional requirements or permit conditions are needed to insure compliance with the referenced regulations, or if the Federal Government promulgates new regulations under Section 405(d) of the Act governing, (a) the treatment or disposal of sewage sludge, (b) sewage sludge management practices, or (c) concentrations of pollutants in sewage sludge, this permit may be reopened, and after notice and opportunity for public hearing, modified accordingly during its term.

6. Prior to any planned change in the permittee's sludge use or disposal practice(s), the permittee shall notify the Department in accordance with the requirements of Part II.A.2.a, "Management Requirements, Notification, Planned Changes" of this permit. A change in the permittee's sludge use or disposal practice(s) shall be considered cause for this permit to be modified, or revoked and reissued, under Part II, Section B 5(b) of this permit.

7. The permittee shall maintain monthly sludge inventory data. This data shall include at a minimum (a) quantity of sludge generated, (b) quantity of sludge stored on site, and (c) quantity of sludge transported off site. Transportation records shall include the date, quantity, carrier used, and the final destination for each shipment. The inventory data shall be maintained at the facility and be made available to the Department in accordance with Part I, Section 8 (Records Retention) of this permit, excepting that records shall be retained for five (5) years.

8. The Department or agencies under its supervision may perform or direct the performance of analyses or biosurveys on the receiving waters in the immediate vicinity of the permittee's discharge or further downstream, after the issuance of this permit. Such analyses or biosurveys may include evaluating impingement, entrainment, and thermal impacts the permittee's facility poses on its intake and receiving waters. If the results of these analyses or biosurveys suggest that the permittee's discharge is causing, or has the potential to cause, diminished attainment of designated protected uses (as defined by the State of Delaware's "Water Quality Standards for Streams") then this permit may be reopened and modified after notice and opportunity for a public hearing. At that time, additional effluent limitations, monitoring requirements and/or special conditions may be included in the permit. If it is determined that additional equipment is

needed to meet the revised permit conditions, the permittee shall install the necessary equipment.

9. The permittee shall demonstrate compliance with the "none detectable" total residual chlorine limit using the following 40 CFR 136.3 approved inorganic test procedures: Iodometric Method I; DPD Ferrous Titrimetric Method; DPD Colorimetric Method; or an equivalent method currently approved in 40 CFR 136. These methods also correspond to Standard Methods (18th Edition) test procedures 4500-Cl B, 4500-Cl F, and 4500-Cl G, respectively.

   Unless otherwise notified in writing by the Department, the permittee shall use the most sensitive method of these test procedures appropriate for the sample matrix. Residual chlorine concentrations less than or equal to the minimum detection level for the selected test procedure shall be considered in compliance with the "none detectable" residual chlorine limit.

10. The effluent limitation for TKN of 3,796 pounds is a moving 12-month cumulative average load limit. The moving 12-month cumulative average load for TKN shall be computed by adding daily average discharge loads for the most current twelve months of operation. As indicated in Part I.B.1. of this permit, a once weekly composite sample shall be analyzed for TKN and the average of the results of the weekly composites for each month will be reported on the monthly DMR as the "daily average". This daily average will then be used to compute the moving 12-month cumulative average load. The daily average load for the month will be multiplied by the number of days in the month to yield a cumulative load for the month. This load for the month will be added to the calculated loads for the previous eleven (11) months, if available, and reported on the DMR as the moving 12-month cumulative average load. During the first eleven months of this permit, there will not be sufficient data to gauge compliance with the moving 12-month cumulative average load limit. However, commencing in the twelfth month following permit issuance the permittee will comply with the moving 12-month cumulative average load limit on a monthly basis.

    Additionally, during the months of May through September of each permit year the daily average load shall not exceed 10.4 lbs/day, and the daily maximum load shall not exceed 15.6 lbs/day. The daily average and daily maximum concentrations must also be reported on the monthly DMR.

11. The permittee shall conduct chronic biomonitoring tests once per year on effluent in accordance with the following requirements. Dependent on the results of the initial tests, outlined in 11.a, the permittee may be required to perform additional testing as outlined in 11.b below. Dependent on the results of the additional testing, the permittee may be required to perform a Toxicity Reduction Evaluation as outlined in 11.c below.

    These tests shall be performed using a dilution series made from representative composite effluent samples and laboratory control water. The dilution series shall use effluent concentrations of 3.4%, 6.6%, 13%, 25.5%,and 50%. Alternative dilution series concentrations may be used if approved by the Department in writing. All testing shall be performed in accordance with the test procedure requirements under 40 CFR 136. At a minimum these tests shall include the following:

    a. The permittee shall simultaneously perform EPA chronic test methods 1000.0 Pimphales promelas Larval Survival and Growth Test, and 1002.0 Ceriodaphnia Survival and

Reproduction Test. Alternative EPA test method approved species may be used, if approved by the Department in writing. Each test shall be initiated no later than 36 hours after the collection of the representative composite effluent sample.

Within 30 days of the completion of these tests, the results shall be reported to the Department. This report shall follow the general format and include the information listed in Section 10, pages 55-57, of EPA/600/4-91/002.

b. If the NOEC (No Observable Effect Concentration) is less than 13% effluent, the permittee shall perform two (2) additional tests on the species in 11.a. Both tests shall be completed within 60 days of the completion date of the testing described in 11.a.

Within 30 days of the completion of each test, the results shall be reported to the Department in accordance with the general format and information requirements referenced in 11.a.

c. If either additional test results in a NOEC less than 13%, the permittee shall submit a plan for reducing the effluent toxicity to the Department. This plan shall be submitted within 60 days of the completion date of the testing described in 11.b. This plan shall outline a schedule, as well as identify the test methods to be used for performing a Toxicity Reduction Evaluation.

For a purpose of these tests, a representative composite sample is a 24-hour composite sample as defined in Part I, Section 3.f. If the instantaneous flow rate does not vary by more than +/- 15 percent of the average flow rate, a time-interval composite will be an acceptable representative sample. Otherwise, a flow-weighted composite sample must be used. All composite samples shall be representative of 24 hours of typical operations.

The Department shall be notified in writing at least thirty (30) days in advance of the day when a bioassay test is planned to commence. The permittee shall split the composite samples used to perform a bioassay test with the Department upon request. All documentation pertaining to these tests shall be maintained at the facility as required in Part I.D, "Monitoring and Reporting", of this permit and shall be made available for inspection, upon request.

ATTACHMENT B:

RESIDENTIAL/

COMMERCIAL

AVERAGES

TABLE B1

NON-INDUSTRIAL CHARACTERISTICS

Pollutant of Concern	EPA Local Limits Guidance (1987) Typical Domestic Average Waste-water Level (mg/L)	Overall Average Pollutant Levels from EPA Supplement to Guidance (1991)(mg/L)	New Castle County (MOT) Residential (mg/L)
Aluminum		N/A	1.2064
Ammonia		43.111	18.6
Arsenic	0.003	0.007	0.025
Beryllium		N/A	0.001
Cadmium	0.003	0.008	0.0126
Chromium (VI)		N/A	0.005
Chromium (T)	0.05	0.034	0.059
Copper	0.061	0.109	0.052
Cyanide	0.041	0.082	0.005
Iron		0.989	N/A
Lead	0.049	0.116	0.022
Mercury	0.0003	0.002	0.0001
Molybdenum		N/A	N/A
Nickel	0.021	0.047	0.137
PCBs		N/A	0.0055
Phenols		0.01	0.036
Selenium		0.004	0.025
Silver	0.004	0.019	0.005
Thallium		N/A	0.0325
Zinc	0.175	0.212	0.069

Note:

(1) New Castle County analytical data is comprised from samples taken from residential locations, in May 1998. (See Table B2)

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TABLE B2

TOWN OF MIDDLETOWN DOMESTIC SEWAGE

	13-May-98	14-May-98	15-May-98	18-May-98	19-May-98	Average
pH	6.78	6.85	6.95	7.54	7.72	7.168
BOD	68	164	216	203	213	172.8
TSS	113	125	33	147	102	104
NH3N	18.0	17.0	19.5	22.5	16.0	18.6
Cd	0.010	0.017	0.017	0.010	0.009	0.0126
Cr	0.05	0.07	0.05	0.07	0.08	0.059
Cu	0.11	0.05	0.05	0.05	0.05	0.052
Ni	0.11	0.05	0.18	0.23	0.14	0.137
Pb	0.04	0.01	0.04	0.01	0.01	0.022
Zn	0.06	0.09	0.05	0.08	0.09	0.069
Al	0.997	1.04	1.66	0.605	1.73	1.2064
As	0.05	0.05	0.05	0.05	0.05	0.025
Be	0.002	0.002	0.002	0.002	0.002	0.001
Hg	0.0002	0.0002	0.0002	0.0002	0.0002	0.0001
Se	0.05	0.05	0.05	0.05	0.05	0.025
Ag	0.01	0.01	0.01	0.01	0.01	0.005
Tl	0.065	0.065	0.065	0.065	0.065	0.0325
CN, T	0.01	0.01	0.01	0.01	0.01	0.005
Phenol,T	0.05	0.05	0.05	0.05	0.08	0.036
Cr+6	0.01	0.01	0.01	0.01	0.01	0.005
PCB-1016	1.5	1.5	1.5	1.5	1.5	0.75
PCB-1221	2.5	2.5	2.5	2.5	2.5	1.25
PCB-1232	2.5	2.5	2.5	2.5	2.5	1.25
PCB-1242	2	2	2	2	2	1
PCB-1248	0.5	0.5	0.5	0.5	0.5	0.25
PCB-1254	1	1	1	1	1	0.5
PCB-1260	1	1	1	1	1	0.5

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Notes:

(1) All samples were 24 hr. composites taken from the manhole behind Middletown Trailer Park.

(2) Results are reported in mg/l, except PCBs which are in ug/l.

(3) Underlined values denote less than the detection limit. If values for a parameter were less than the detectable limit, half of the value was used in calculating the average.

ATTACHMENT C:

INDUSTRIAL

LOADINGS

TABLE C1

LOADINGS (LB/DAY) FOR INDUSTRIAL USERS IN MOT SERVICE AREA

Johnson Controls	As	Cd	Cr	Cu	Pb	Hg	Mo	Ni	Se	Zn
July-Dec 1996	0.00014	0.00025	0.00061	0.00022	0.02115	0.00002	0.04280	0.00253	0.00008	0.00190
Jan-June 1996	0.00024	0.00034	0.00058	0.01800	0.02800	0.00016	0.01860	0.00217	0.00007	0.00710
July-Dec 1995	0.00012	0.00034	0.00062	0.00166	0.01780	0.00016	0.06220	0.00230	0.00008	0.00890
Jan-June 1995	0.00014	0.00059	0.00041	0.00110	0.01050	0.00001	0.04660	0.00124	0.00007	0.00320
July- Dec 1994	0.00011	0.00021	0.00042	0.00110	0.00910	0.00001	0.01200	0.00320	0.00006	0.00091
Jan-June 1994	0.00011	0.00026	0.00067	0.00120	0.01330	0.00001	0.03920	0.00250	0.00007	0.01900
July- Dec 1993		0.00020	0.00063	0.00210	0.01960			0.00210		0.00250
Average	0.00014	0.00031	0.00056	0.00363	0.01706	0.00006	0.03690	0.00229	0.00007	0.00622
Avg. (mg/L) (Flow = 0.0071mgd)	0.0017	0.0050	0.0100	0.0608	0.2890	0.0017	0.6230	0.0390	0.0017	0.1050

Mac Dermid Imaging	As	Cd	Cr	Cu	Pb	Hg	Mo	Ni	Se	Zn
July- Dec 1996	0.00017	0.00017	0.00051	0.00069	0.01711	0.00001	0.00089	0.00018	0.00017	0.02211
Jan-June 1996	0.00033	0.00033	0.00100	0.00074	0.00330	0.00001	0.00170	0.00017	0.00033	0.02190
July-Dec 1995	0.00016	0.00016	0.00140	0.00130	0.00480	0.00001	0.00240	0.00021	0.00048	0.04100
Jan-June 1995	0.00048	0.00048	0.00150	0.00140	0.00480	0.00001		0.00017	0.00048	0.02100
July- Dec 1994		0.00011	0.00002	0.00140	0.00520			0.00049		0.01800
Jan-June 1994					0.00250					0.00670
July- Dec 1993					0.00370					0.00960
Average	0.00029	0.00025	0.00089	0.00111	0.00592	0.00001	0.00166	0.00024	0.00037	0.02004
Avg. (mg/L) (Flow = 0.0036mgd)	0.0100	0.0100	0.0300	0.0370	0.1970	0.0003	0.0570	0.0067	0.0130	0.6700

Industrial flows were obtained from self-monitoring submissions.

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ATTACHMENT D:

REMOVAL

EFFICIENCY

DATA

TABLE D1 MOT WATER FARM ANALYTICAL RESULTS

Influent

Sample Date	As (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Hg (mg/L)	Mo (mg/L)	Ni (mg/L)	Pb (mg/L)	Se (mg/L)	Zn (mg/L)
1/8/97	0.002	0.030	0.01	0.04	0.0002	0.021	0.02	0.02	0.002	0.08
1/15/97	0.002	0.024	0.06	0.06	0.0002	0.005	0.01	0.11	0.002	0.05
1/22/97	0.002	0.013	0.04	0.05	0.0002	0.005	0.01	0.20	0.002	0.12
1/28/97	0.002	0.028	0.09	0.07	0.0002	0.005	0.08	0.04	0.002	0.13
4/21/97	0.002	0.020	0.03	0.08	0.0002	0.080	0.04	0.04	0.002	0.11
4/28/97	0.002	0.020	0.78	0.10	0.0002	0.052	0.28	0.04	0.002	0.13
5/7/97	0.002	0.020	0.37	0.10	0.0002	0.032	0.19	0.02	0.002	0.13
5/15/97	0.002	0.020	0.03	0.03	0.0002	0.065	0.04	0.02	0.002	0.08
5/23/97	0.002	0.020	0.03	0.03	0.0002	0.032	0.04	0.03	0.002	0.07
10/13/97						0.021				0.127
10/14/97						0.066				0.114
10/15/97						0.055				0.126
10/16/97						0.061				0.143
10/17/97			.041			0.034				0.084
Average	0.0012	0.016	0.154	0.062	0.0001	0.038	0.071	0.056	0.001	0.11

Effluent

Sample Date	As (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Hg (mg/L)	Mo (mg/L)	Ni (mg/L)	Pb (mg/L)	Se (mg/L)	Zn (mg/L)
11/13/96		0.02		0.04			0.07			0.25
4/21/97	0.002	0.02	0.07	0.02	0.0002	0.039	0.04	0.02	0.002	0.36
4/28/97	0.002	0.02	0.08	0.02	0.0002	0.032	0.04	0.02	0.002	0.34
5/7/97	0.002	0.02	0.03	0.01	0.0004	0.067	0.04	0.02	0.002	0.03
5/15/97	0.002	0.02	0.03	0.01	0.0002	0.035	0.04	0.02	0.002	0.26
5/23/97	0.002	0.02	0.03	0.02	0.0002	0.019	0.04	0.02	0.002	0.04
10/13/97						0.061				0.015
10/14/97						0.04				0.465
10/15/97						0.055				0.388
10/16/97						0.04				0.447
10/17/97				0.02		0.055				0.446
Average	0.001	0.012	0.039	0.018	0.00016	0.044	0.028	0.01	0.001	0.2791

*Note: Underlined values indicate the parameter was not detectable at the detection limit. In accordance with EPA guidelines, one-half of the underlined value was used in calculating averages.

Mean Removal Efficiencies (%) 67.70%

As	Cd	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
16.66666667	28	74.6753247	70.96774194	-60	-15.78947368	60.5633803	82.1428571429	0	-161.5394913

Note: In comparison to references (see Attachment G), removal efficiencies for Cr, Cu, Ni, and Pb appear to be high. Therefore, more conservative estimates were used in calculations. Also, due to a limiting level of detection for Hg, a conservative estimated removal efficiency was used for further calculations.

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ATTACHMENT E:

MOT

LOCAL LIMITS

CALCULATIONS

TABLE E1

1997 NON-DOMESTIC EFFLUENT LIMITS **(WATER QUALITY BASED)**

Metal	Present Limits (mg/l)	Influent Average (mg/L)	Effluent Average (mg/L)	% Removal	Allowable Effluent Conc. (mg/L) (15% s.f.)	Allowable Influent Conc.(mg/l)	Total Influent Flow (MGD)	Industrial Influent Flow (MGD)	Domestic Flow (MGD)
Arsenic	1.00	0.001	0.001	16.7%	0.043	0.0510	0.5	0.016	0.484
Cadmium	0.02	0.016	0.010	28.0%	0.009	0.0125	0.5	0.016	0.484
Chromium (VI)	0.50	N/A	N/A	35.5%	0.014	0.0217	0.5	0.016	0.484
Chromium (T)	1.50	0.154	0.039	35.5%	3.400	5.2713	0.5	0.016	0.484
Copper	0.15	0.062	0.018	41.0%	0.040	0.0678	0.5	0.016	0.484
Cyanide	0.30	N/A	N/A	28.0%	0.019	0.0264	0.5	0.016	0.484
Lead	0.50	0.056	0.010	28.5%	0.043	0.0594	0.5	0.016	0.484
Mercury	0.001	0.0001	0.0002	25.5%	0.000	0.0001	0.5	0.016	0.484
Nickel	0.02	0.071	0.028	40.0%	0.085	0.1417	0.5	0.016	0.484
Silver	0.02	N/A	N/A	85.0%	0.001	0.0058	0.5	0.016	0.484
Zinc	1.00	0.110	0.279	-161.5%	0.235	0.0899	0.5	0.016	0.484

Notes:

(1) Generally, %Removal values are based on analytical data. When data was not available or representative, values were used from Table 3, Appendix L of the Guidance Manual for POTW Program Development, and the "Focus on Toxic Chemicals" article.
(See Attachment G for reference materials)

(2) In cases where reference data was used, a conservative estimate (50% of the median value) was used.

file:c:\mot\metals2.wb2

TABLE E2

1997 NON-DOMESTIC EFFLUENT LIMITS (WATER QUALITY BASED)

Metal	Allowable Influent Conc. (mg/l)	Allowable Influent Load (lbs/day)	Domestic Concentration. (mg/l)	Domestic Load (lbs/day)	Allowable Industrial Load (lbs/day)	Allowable Industrial Conc. (mg/l)
Arsenic	0.051	0.213	0.0250	0.101	0.112	0.84
Cadmium	0.013	0.052	0.0126	0.051	0.001	0.01
Chromium (VI)	0.022	0.091	0.0050	0.020	0.070	0.53
Chromium (T)	5.271	21.981	0.0590	0.238	21.743	162.94
Copper	0.068	0.283	0.0520	0.210	0.073	0.55
Cyanide	0.026	0.110	0.0050	0.020	0.090	0.67
Lead	0.059	0.248	0.0220	0.089	0.159	1.19
Mercury	0.000	0.000	0.0001	0.000	0.000	0.0002
Nickel	0.142	0.591	0.1370	0.553	0.038	0.28
Silver	0.006	0.024	0.0050	0.020	0.004	0.030
Zinc	0.090	0.375	0.0690	0.279	0.096	0.72

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TABLE E1 FORMULAS

1997 NON-DOMESTIC EFFLUENT LIMITS

(WATER QUALITY BASED)

	Metal (C)	Present Limits (mg/l) (D)	Influent (mg/L) (E)	Effluent (mg/L) (F)	% Removal (G)	Allowable Effluent Conc. (mg/L) (15% s.f.) (H)	Allowable Influent Conc.(mg/l) (I)	Total Influent Flow (MGD) (J)	Industrial Influent Flow (MGD) (K)	Domestic Flow (MGD) (L)
(81)	Arsenic	1.00	0.001	0.001	16.7%	0.043	+H81/(1-G81)	0.5	0.016	+J81-K81
(82)	Cadmium	0.02	0.016	0.010	28.0%	0.009	+H83/(1-G83)	0.5	0.016	+J83-K83
(83)	Chromium (VI)	0.50	N/A	N/A	35.5%	0.014	+H84/(1-G84)	0.5	0.016	+J84-K84
(84)	Chromium (T)	1.50	0.154	0.039	35.5%	3.400	+H85/(1-G85)	0.5	0.016	+J85-K85
(85)	Copper	0.15	0.062	0.018	41.0%	0.040	+H86/(1-G86)	0.5	0.016	+J86-K86
(86)	Cyanide	0.30	N/A	N/A	28.0%	0.019	+H87/(1-G87)	0.5	0.016	+J87-K87
(87)	Lead	0.50	0.056	0.010	28.5%	0.043	+H89/(1-G89)	0.5	0.016	+J89-K89
(88)	Mercury	0.001	0.0001	0.0002	25.5%	0.000	+H90/(1-G90)	0.5	0.016	+J90-K90
(89)	Nickel	0.02	0.071	0.028	40.0%	0.085	+H92/(1-G92)	0.5	0.016	+J92-K92
(90)	Silver	0.02	N/A	N/A	85.0%	0.001	+H94/(1-G94)	0.5	0.016	+J94-K94
(91)	Zinc	1.00	0.110	0.279	-161.5%	0.235	+H96/(1-G96)	0.5	0.016	+J96-K96

Notes:

(1) Generally, %Removal values are based on analytical data. When data was not available or representative, values were used from Table 3, Appendix L of the Guidance Manual for POTW Program Development, and the "Focus on Toxic Chemicals" article. (See Attachment G for reference materials)

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(2) In cases where reference data was used, a conservative estimate (50% of the median value) was used.

TABLE E2 FORMULAS

1997 NON-DOMESTIC EFFLUENT LIMITS (WATER QUALITY BASED)

	Metal (O)	Allowable Influent Conc. (mg/l) (P)	Allowable Influent Load (lbs/day) (Q)	Domestic Concentration. (mg/l) (R)	Domestic Load (lbs/day) (S)	Allowable Industrial Load (lbs/day) (T)	Allowable Industrial Conc. (mg/l) (U)
(81)	Arsenic	+H81/(1-G81)	+J81*8.34*P81	0.0250	+L81*8.34*R81	+Q81-S81	+T81/(8.34*K81)
(82)	Cadmium	+H83/(1-G83)	+J83*8.34*P83	0.0126	+L83*8.34*R83	+Q83-S83	+T83/(8.34*K83)
(83)	Chromium (VI)	+H84/(1-G84)	+J84*8.34*P84	0.0050	+L84*8.34*R84	+Q84-S84	+T84/(8.34*K84)
(84)	Chromium (T)	+H85/(1-G85)	+J85*8.34*P85	0.0640	+L85*8.34*R85	+Q85-S85	+T85/(8.34*K85)
(85)	Copper	+H86/(1-G86)	+J86*8.34*P86	0.0620	+L86*8.34*R86	+Q86-S86	+T86/(8.34*K86)
(86)	Cyanide	+H87/(1-G87)	+J87*8.34*P87	0.0050	+L87*8.34*R87	+Q87-S87	+T87/(8.34*K87)
(87)	Lead	+H89/(1-G89)	+J89*8.34*P89	0.0220	+L89*8.34*R89	+Q89-S89	+T89/(8.34*K89)
(88)	Mercury	+H90/(1-G90)	+J90*8.34*P90	0.0001	+L90*8.34*R90	+Q90-S90	+T90/(8.34*K90)
(89)	Nickel	+H92/(1-G92)	+J92*8.34*P92	0.1420	+L92*8.34*R92	+Q92-S92	+T92/(8.34*K92)
(90)	Silver	+H94/(1-G94)	+J94*8.34*P94	0.0040	+L94*8.34*R94	+Q94-S94	+T94/(8.34*K94)
(91)	Zinc	+H96/(1-G96)	+J96*8.34*P96	0.0740	+L96*8.34*R96	+Q96-S96	+T96/(8.34*K96)

ATTACHMENT F:

PRELIM V. 5.0

DATA SHEETS

&

REPORT

POTW Name: MOT Water Farm

POLLUTANT	CALCULATED FROM FIELD SAMPLING DATA			POTW INFLUENT LOAD (lbs/day)	DIFFERENCE (cols. 4 & 5) (percent)
	UNCONTROLLABLE (Nonindustrial SOURCES (lbs/day)	CONTROLLABLE (Industrial) SOURCES (lbs/day)	TOTAL SOURCES (cols. 2 & 3) (lbs/day)		
Arsenic	0.1009	0.0008	0.1017	0.0050	-95.0794
Cadmium	0.0509	0.0010	0.0519	0.0667	28.6503
Chromium	0.2382	0.0027	0.2408	0.6422	166.6575
Chromium, hex	0.0202	0.0000	0.0202	0.0000	-100.0000
Copper	0.2099	0.0065	0.2164	0.2585	19.4587
Cyanide	0.0202	0.0000	0.0202	0.0000	-100.0000
Lead	0.0888	0.0324	0.1212	0.2335	92.6253
Mercury	0.0004	0.0001	0.0005	0.0004	-22.3608
Nickel	0.5530	0.0030	0.5561	0.2961	-46.7555
Zinc	0.2785	0.0517	0.3302	0.4587	38.9029

UNIFORM CONCENTRATION INDUSTRIAL EFFLUENT LIMITS (mg/l)
(APPLIED TO NON-DOMESTIC FLOW ONLY)

POTW Name: MOT Water Farm

POLLUTANT	Using Total Industrial Flow	Using Industrial Contributory Flow	Contributory * Flow (MGD)	Basis in Derivation of Limit
Arsenic	0.8381	0.8381	0.0160	PASS THROUGH
Cadmium	0.0000	0.0000	0.0160	PASS THROUGH
Chromium	162.9439	162.9439	0.0160	PASS THROUGH
Chromium, hex	0.5077	10000000.0000	0.0000	PASS THROUGH
Copper	0.4980	0.4980	0.0160	PASS THROUGH
Cyanide	0.6604	10000000.0000	0.0000	PASS THROUGH
Lead	1.1920	1.1920	0.0160	PASS THROUGH
Mercury	0.0002	0.0002	0.0160	PASS THROUGH
Nickel	0.2828	0.2828	0.0160	PASS THROUGH
Zinc	0.7163	0.7163	0.0160	PASS THROUGH

* - Industry contributory flow is defined as total flow from those industries contributing the specific pollutant

Data Sheet 1

PRELIM 5.0: FACILITY PROFILE

A. POTW NAME: [MOT Water Farm]

B. WASTEWATER UNIT OPERATIONS
(Put an 'X' where appropriate)
[ ] (1) Primary Clarification
[ ] (2) Activated Sludge
[ ] (2) Trickling Filter
[X] (2) Other Secondary
[ ] (3) Nitrification
[X] (3) Other Tertiary

D. EFFLUENT DISPOSAL METHOD
(Put an 'X' where appropriate)
[X] Fresh [ ] Estuarine
[ ] Salt [ ] Other

OR - dilution figured into water quality standards

E. RECEIVING WATER DILUTION
1Q10 Based: [ ] (upstream 1Q10 flow) x (% available) / (POTW flow)

7Q10 Based: [ ] (upstream 7Q10 flow) x (% available) / (POTW flow)

C. PLANT FLOW INFORMATION

POTW Average Flow (mgd): [0.500]
Industrial Flow (mgd): [0.016]
Nonindustrial Flow (mgd): [0.484]
Sludge to Digester (mgd): [ ]

F. SLUDGE DIGESTION OPERATIONS
(Put an 'X' where appropriate)
[ ] Aerobic [ ] Other
[ ] Anaerobic

****

G. SLUDGE FLOW TO DISPOSAL	Quantity (mt/day)	Site Area (hectares)	Site Life (years)	AWSAR (mt/ha/yr)	Distance from Unit to Property Line (m)
Codisposal/Landfill:	[ ]				
Bulk Land Application (Agric,...):	[ ]	[ ]	[ ]		
Bulk Land Application (Lawn/Home):	[ ]				
Non-Bulk Land Application:	[ ]			[ ]	
Surface Disposal	[ ]				[ ]
Incineration	[ ]				
Other Disposal	[ ]				

H. SLUDGE INCINERATOR TYPE
(Put an 'X' where appropriate)
[ ] Fluidized Bed with Wet Scrubber
[ ] Fluidized Bed with Wet Scrubber and Wet Electrostatic Precipitator
[ ] Other types with Wet Scrubber
[ ] Other types with Wet Scrubber and Wet Electrostatic Precipitator

I. INCINERATOR DISPERSION FACTOR: [ ]

Data Sheet 2.1
POTW Name: MOT Water Farm

PRELIM 5.0 - STANDARDS AND CRITERIA

POLLUTANT	Average Influent Concentration (mg/l)	Average Nonindustrial Concentration (mg/l)	NPDES Effluent Limit (mg/l)	Background Concentration in Receiving Water (mg/l)	Chronic Water Quality Criterion/ Standard(mg/l)	Acute Water Quality Criterion/ Standard(mg/l)
Arsenic	0.0012	0.025 0.0037			1.444	0.36
Cadmium	0.016	0.0126			0.019	0.0123
Chromium	0.154	0.059			5.1072	4
Chromium, hex		0.005			0.0836	0.016
Copper	0.062	0.052			0.304	0.046
Cyanide		0.005			0.03952	0.022
Lead	0.056	0.022	0.15		0.152	0.3
Mercury	0.0001	0.0001			0.000091	0.0024
Nickel	0.071	0.137			4.0432	3.34
Zinc	0.110	0.069			2.7208	0.276

Data Sheet 2.2
POTW Name: MOT Water Farm

PRELIM 5.0 - STANDARDS AND CRITERIA

POLLUTANT	Other Water Quality Criterion/ Standard (mg/l)	Pollutant Level in Sludge to Digester (mg/l)	Pollutant Level in Sludge to Disposal (mg/kg)	Federal Land Application Ceiling Conc. (mg/kg)	Federal Cumulative Application Rate (kg/ha)	Federal Land Application Criterion (mg/kg)
Arsenic	0.05			75.0	41.0	41.0
Cadmium	0.01			85.0	39.0	39.0
Chromium						
Chromium, hex						
Copper				4300.0	1500.0	1500.0
Cyanide						
Lead	0.05			840.0	300.0	300.0
Mercury				57.0	17.0	17.0
Nickel	0.10			420.0	420.0	420.0
Zinc				7500.0	2800.0	2800.0

Data Sheet 2.3
POTW Name: MOT Water Farm

PRELIM 5.0 - STANDARDS AND CRITERIA

POLLUTANT	Federal Annual Application Rate (kg/ha/yr)	Federal Surface Disposal Criterion (mg/kg)	NESHAP (grams/day)	NAAQS Air Quality Std. or RSC value (ug/cubic m)	Incinerator Control Efficiency (%)	State Sludge Cumulative Application Rate (kg/ha)
Arsenic	2.0	30		0.023		
Cadmium	1.9			0.057		
Chromium		200				
Chromium, hex						
Copper	75.0					
Cyanide						
Lead	15.0			1.5		
Mercury	0.85		3200			
Nickel	21.0	210		2.0		
Zinc	140.0					

Data Sheet 2.4
POTW Name: MOT Water Farm

PRELIM 5.0 - STANDARDS AND CRITERIA

POLLUTANT	State Sludge Annual Application Rate (kg/ha/yr)	Other State Sludge Criterion (mg/kg)	State Incinerator Emission Limit (grams/day)	Activated Sludge Inhibition Criteria (mg/l)	Trickling Filter, RBC Inhibition Criteria (mg/l)	Other Secondary Inhibition Criteria (mg/l)
Arsenic						
Cadmium						
Chromium						
Chromium, hex						
Copper						
Cyanide						
Lead						
Mercury						
Nickel						
Zinc						

Data Sheet 2.5
POTW Name: MOT Water Farm

PRELIM 5.0 - STANDARDS AND CRITERIA

POLLUTANT	Nitrification Inhibition Criteria (mg/l)	Other Tertiary Inhibition Criteria (mg/l)	Aerobic Digester Inhibition Criteria (mg/l)	Anaerobic Digester Inhibition Criteria (mg/l)	Other Digester Inhibition Criteria (mg/l)	Removal Efficiency Through Primary (%)
Arsenic						
Cadmium						
Chromium						
Chromium, hex						
Copper						
Cyanide						
Lead						
Mercury						
Nickel						
Zinc						

Data Sheet 2.6
POTW Name: MOT Water Farm

PRELIM 5.0 - STANDARDS AND CRITERIA

POLLUTANT	Removal Efficiency Through Secondary (%)	Plant Removal Efficiency (Pass-Through) (%)	Plant Removal Efficiency (Sludge) (%)	Safety Factor (%)		
Arsenic		16.7 ✓		15		
Cadmium		28.0 ✓		15		
Chromium		35.5 ?	74.7	15		
Chromium, hex		35.5 0		15		
Copper		41.0 ?	70.0	15		
Cyanide		28 0		15		
Lead		28.5	82.1	15		
Mercury		25.5	-60	15		
Nickel		40.0	60.6	15		
Zinc		-161.5	-161.5	15		

Data Sheet 3
POTW Name: MOT Water Farm

PRELIM 5.0: REMOVAL EFFICIENCY DATA

POLLUTANT	Date: 04/21/97 Flow (mgd): 0.50			Date: 04/28/97 Flow (mgd): 0.50			Date: 05/07/97 Flow (mgd): 0.50			Date: 05/15/97 Flow (mgd): 0.50		
	Total Removal%	Influent (mg/l)	Effluent (mg/l)	Total Removal%	Influent (mg/l)	Effluent (mg/l)	Total Removal%	Influent (mg/l)	Effluent (mg/l)	Total Removal%	Influent (mg/l)	Effluent (mg/l)
Arsenic		0.001	0.001		0.001	0.001		0.002	0.001		0.001	0.001
Cadmium		0.01	0.01		0.01	0.01		0.01	0.01		0.01	0.01
Chromium		0.015	0.07		0.78	0.08		0.37	0.015		0.015	0.015
Chromium, hex												
Copper		0.08	0.02		0.10	0.02		0.10	0.005		0.03	0.005
Cyanide												
Lead		0.04	0.01		0.04	0.01		0.01	0.01		0.01	0.01
Mercury		0.0001	0.0001		0.0001	0.0001		0.0001	0.0004		0.0001	0.0001
Nickel		0.02	0.02		0.28	0.02		0.19	0.02		0.02	0.02
Zinc		0.11	0.36		0.13	0.34		0.13	0.03		0.08	0.26

Data Sheet 3
POTW Name: MOT Water Farm

PRELIM 5.0: REMOVAL EFFICIENCY DATA

POLLUTANT	Date: 05/23/97 Flow (mgd): 0.50			Date: Flow (mgd):			Date: Flow (mgd):			Date: Flow (mgd):		
	Total Removal%	Influent (mg/l)	Effluent (mg/l)	Total Removal%	Influent (mg/l)	Effluent (mg/l)	Total Removal%	Influent (mg/l)	Effluent (mg/l)	Total Removal%	Influent (mg/l)	Effluent (mg/l)
Arsenic		0.001	0.001									
Cadmium		0.01	0.01									
Chromium		0.015	0.015									
Chromium, hex												
Copper		0.03	0.02									
Cyanide												
Lead		0.03	0.015									
Mercury		0.0001	0.0001									
Nickel		0.02	0.02									
Zinc		0.07	0.04									

Data Sheet 4
POTW Name: MOT Water Farm

PRELIM 5.0: INDUSTRIAL USER DATA

POLLUTANT	IU: Johnson Contr Flow: 0.008		IU: MacDermid Ima Flow: 0.008		IU: Flow:		IU: Flow:		IU: Flow:	
	Average Effluent (mg/l)	Selected Removal (%)	Average Effluent (mg/l)	Selected Removal (%)	Average Effluent (mg/l)	Selected Removal (%)	Average Effluent (mg/l)	Selected Removal (%)	Average Effluent (mg/l)	Selected Removal (%)
Arsenic	0.0017		0.01							
Cadmium	0.005		0.01							
Chromium	0.01		0.03							
Chromium, hex										
Copper	0.0608		0.037							
Cyanide										
Lead	0.289		0.197							
Mercury	0.0017		0.0003							
Nickel	0.039		0.0067							
Zinc	0.105		0.67							

ATTACHMENT G

REFERENCES

FOCUS

Comparative removal of toxic pollutants by six wastewater treatment processes

Sidney A. Hannah, Barry M. Austern, Atal E. Eralp, Robert H. Wise

Sections 301(h) and 403(c) of the Federal Water Pollution Control Act set permit requirements and ocean discharge criteria that apply to permits for discharge of wastewaters into marine waters. Complete secondary treatment, which is normally required for wastewaters discharged to inland waters, may not be necessary to meet ocean discharge criteria. Alternative treatment processes that produce a lower quality effluent at a substantially reduced cost have been suggested as substitutes for secondary processes. The objectives of this study were to evaluate selected pilot-scale alternative treatment processes designed to provide less-than-secondary treatment for removal of toxic pollutants, and to determine how the toxics partition and interact within the processes.

The U. S. Environmental Protection Agency (EPA) has published proposed water quality criteria to protect saltwater aquatic life from acute or chronic toxicity, and to protect humans from the toxic properties of pollutants ingested through contaminated aquatic organisms.[1] Table 1 lists the proposed criteria for 21 volatile and semivolatile organic priority pollutants and five metals representative of toxic pollutants in municipal wastewaters. A survey of 50 publicly owned treatment works for priority pollutants[2] showed that influent wastewater concentrations at one or more of the plants exceeded the criteria for 13 of the 21 listed organic pollutants and four of the five metals.

Alternatives to the activated sludge process do not remove toxics as well, but may be useful where removal requirements or water quality criteria are not overly restrictive.

Processes chosen as having greatest potential application for 301(h) permits were single-stage high-rate trickling filter, primary treatment with chemical addition, direct filtration of primary effluent, aerated lagoons, and single-stage facultative lagoons. A conventional activated sludge system was operated in parallel with the alternative systems to provide a control against which the alternative systems could be compared. Influent wastewater was spiked with 21 listed priority pollutant organics dissolved in toluene. Because ambient concentrations of the five metals in the influent wastewater were sufficiently high, spiking of metals was not required. Samples of feed, effluents, and sludges were analyzed for both conventional and priority pollutants. This report discusses the results of the study conducted by the Water Engineering Research Laboratory at the Test and Evaluation (T&E) Facility, Cincinnati, Ohio. Petrasek *et al.*[3,4] reported removals of metals and organics by activated sludge treatment at this facility.

Samples of feed and effluents were also collected to assess toxicity reduction through treatment; 7-day subchronic tests with fathead minnow and chronic tests with *Ceriodaphnia* were used. Results of those tests were reported elsewhere.[5]

PILOT PLANT SYSTEMS

The four biological treatment systems were operated on spiked wastewater for 30 days before the first samples were collected. This permitted the biomass to acclimate to the added toxics. The systems operated continuously on spiked wastewater after startup to maintain the biomass in an acclimated condition. The primary with chemical addition system and the high-flow direct filtration of primary effluent system were operated only during scheduled sampling periods to reduce the cost of spiking chemicals and associated labor in spike concentrate preparation.

Pretreatment. Raw wastewater at the T&E Facility, pumped from the adjacent Mill Creek Wastewater Treatment Plant, is of relatively high strength with a 14-month average (May 1982 to June 1983) of 279 mg/L biochemical oxygen demand (BOD) and 487 mg/L total suspended solids (TSS). Mill Creek secondary effluent was passed through a bed of granular activated carbon and used to dilute the raw wastewater 1:1 to provide pilot system wastewater feed concentrations that are more typical of domestic U. S. wastewater. Average concentrations of conventional pollutants in the feed are shown in Table 2.

Two steel columns 74 cm inside diameter (ID) and 3.7 m high, each containing 1.5 m depth of 8 × 30 mesh granular activated carbon were used to treat the Mill Creek secondary effluent. One column normally operated with the other in backwash or standby mode. The carbon was not regenerated during the 8-month study. An equal volume of coarse-screened raw wastewater was mixed with the carbon column effluent, and the spiking solution of 21 priority pollutant organics in toluene was pumped into the combined wastewater to provide 100 µg/L of each priority pollutant. Fifty µg/L of both lindane and heptachlor were added only during the last 2 months of the study. The organic priority pollutants are listed in Table 1. The spiked wastewater contained 70 mg/L toluene.

The resulting spiked wastewater was passed through a static mixer into three closed detention tanks arranged in series to provide time for the priority pollutants to equilibrate with solids in the wastewater. Detention times ranged between 1.2 and 5.6 hours depending on the number of pilot systems in operation. To prevent solids from depositing in the detention tanks at low flows, effluent from the third tank was pumped through a recirculation line back to the first tank. The spiked equilibrated wastewater was pumped from the recirculation line to feed all systems. Samples of raw wastewater, carbon column effluent,

those described for the activated sludge system. The trickling filter is a circular steel tank, 2.4 m high with a 0.91-m ID, which contains 1.9 m of 3.8 to 7.6-cm (1.5 to 3 in.) crushed slag media. Primary effluent and return flow from the bottom of the trickling filter are applied to the media from a motor-driven rotating distributor arm. The return flow is adjusted to 8.2 m^3/d, equivalent to 100% of the design wastewater flow. Based on design wastewater flow, the surface application rate to the filter is 12.4 $m^3/m^2 \cdot d$, while the application rate for the volume of media is 6.6 $m^3/m^3 \cdot d$.

The high rate trickling filter system removed 76% of the influent TSS, but only 47% of COD and 26% of soluble COD. TKN was reduced by 14%; total phosphorus was reduced by 39%.

Primary treatment with chemical addition. The 10.9-m^3/d (2-gpm) chemical addition system consists of a rapid-mix tank where alum solution is flash-mixed with the wastewater, a flocculation tank where gentle agitation produces a settleable floc, and a final clarifier where the solids are separated from the wastewater. The rapid-mix tank is constructed of stainless steel and has a 29.5-cm ID and a 8.9-cm liquid depth. It is equipped with a propeller mixer and has a detention time of 48 seconds at design flow. The rectangular steel flocculation tank is 0.6 m wide by 1.4 m long and has a water depth of 0.4 m. It is equipped with two paddle stirrers and has a detention time of 52 minutes at design flow. The steel clarifier is 0.95 m ID and has a 1.45-m sidewater depth. The overflow rate is 15.2 $m^3/m^2 \cdot d$. Alum stock solution (19 g/L) is prepared in stainless steel drums by dissolving commercial filter alum in tap water. This solution is pumped to the rapid-mix tank at a constant dosage of 250 mg/L in the wastewater.

The chemical treatment system removed 89% of influent TSS to produce a relatively clear effluent. Alum precipitation of phosphorus reduced total phosphorus by 75%. The system reduced COD, soluble COD, and TKN by 49%, 2%, and 12%, respectively.

Direct filtration of primary effluent. Primary effluent is produced when spiked wastewater is passed through a circular steel tank with a 2.3-m ID and a 2.7-m sidewater depth. Detention time is 3.9 hours and overflow rate is 17.0 $m^3/m^2 \cdot d$ at a wastewater flow of 69.8 m^3/d (12.8 gpm). The filter that receives the primary effluent is a commercial pulsed-bed pilot unit. This filter uses a 0.25-m bed of 0.35-mm sand as media. The surface loading rate at 54.5 m^3/d (10 gpm) flow is 147 $m^3/m^2 \cdot d$.

The primary plus filtration system removed 86% of TSS, 40% of COD, 15% of TKN, and 44% of total phosphorus.

Lagoon systems. The aerated and facultative lagoons are constructed from sections of concrete pipe, 2.3-m ID. The sidewater depth is 1.2 m, surface area is 4.1 m^2, and wastewater volume is 4.8 m^3. Each lagoon has fourteen 96-in. 5000°K fluorescent lamps suspended 1.8 m above the water surface. The lights are turned on for 14 hours daily.

Wastewater is fed to the lagoons by transfer pump from a 0.19-m^3 batch tank. The facultative lagoon receives 0.19 m^3 once a day, while the aerated lagoon receives 0.19 m^3 four times a day. The hydraulic detention times of the facultative and aerated lagoons are 25.6 days and 6.4 days, respectively. The aerated lagoon is equipped with a perforated pipe sparger attached to the pilot plant compressed air line.

Because of the small size of the lagoon and the absence of a settling compartment, only low air flow rates that were approximately equivalent to the influent BOD could be used to avoid carryout of settleable solids. The air flow was 835 L/d. Dissolved oxygen concentrations in both lagoons, measured 0.3 m below the surface, generally ranged from 0.1 to 0.2 mg/L.

The facultative lagoon removed 84% of TSS, 65% of COD, 42% of soluble COD, 11% of TKN, and 31% of total phosphorus. The aerated lagoon removed 85% of TSS, 60% of COD, 42% of soluble COD, 2% of TKN, and 19% of total phosphorus. While algae blooms occurred periodically in the lagoons, performance was not significantly affected. With their relatively long detention times, the two lagoons produced the best effluents of all the alternative processes but were less effective than the activated sludge control in removing conventional pollutants.

Sample collection and analysis. Twenty-four hour composite samples of process streams prepared from grab samples collected six times per day were analyzed every other day for conventional pollutants using the standard U. S. EPA methods[6] listed in Table 3. One set of 24-hour composite samples was analyzed for metals each week. Additional grab samples were analyzed three times per day for pH and alkalinity and once daily for solids to control the activated sludge process. All samples were refrigerated at 4°C until analyzed, and sample preservatives were used as permitted by the standard methods.

Samples were collected for 2 or 3 consecutive days at approximately 6-week intervals for organic priority pollutant analyses. Grab samples for volatile analysis were collected three times per day in screw-cap glass vials with an inert fluorocarbon polymer-lined septum. Initially, these grab samples were analyzed individually by the U. S. EPA purge-and-trap technique (Method 1624[7]) but a growing backlog of samples made it necessary to composite chilled grab samples into a single daily composite before analysis. Samples were composited in a 4°C room. The contents of the three vials were gently poured down the side of a chilled Erlenmeyer flask. The flask was gently swirled, and its contents were added to the overflow level of one of the three vials. Analyses of multiple samples that were spiked with known concentrations of priority volatile organics before compositing did not show any losses caused by the nonstandard compositing

Table 3—Analytical methods for conventional pollutants and metals.

Parameter	Method[6]	Description
TSS	160.2	Glass filter, 102° to 105°C
Total COD	410.4	Automated dichromate reflux
Soluble COD	410.4	Glass filter automated dichromate reflux
TKN	351.2	Semi-automated block digestion
NH_3-N	350.1	Automated phenolate
NO_2-N	353.1	Automated hydrazine reduction
NO_3-N	353.1	Automated hydrazine reduction
TP	365.4	Semi-automated block digestion
pH	150.1	Electrode
Alkalinity	310.1	Manual titration
DO	360.1	Membrane electrode
Cr	218.2	Atomic absorption, furnace
Cu	220.2	Atomic absorption, furnace
Ni	249.2	Atomic absorption, furnace
Pb	239.2	Atomic absorption, furnace
Cd	213.2	Atomic absorption, furnace

Table 6—Removal of volatile organics by different processes.

Compound	Primary clarification		Primary plus filtration		Chemical clarification		Trickling filter		Activated sludge		Aerated lagoon		Facultative lagoon	
	% Removal	σ	% Removal	σ	% Removal	σ	% Removal	σ	% Removal	σ	% Removal	σ	% Removal	σ
Carbon tetrachloride	19	34	22	37	−13	24	59	22	74	22	70	27	77	24
1,1 Dichloroethane	−2	17	32	9	21	14	34	12	94	2	68	4	87	4
1,1 Dichloroethylene	5	31	22	21	25	30	58	16	92	7	60	22	85	17
Chloroform	−7	15	18	9	20	15	25	18	86	9	61	11	80	7
1,2 Dichloroethane	7	14	34	9	22	31	33	16	84	10	70	14	90	7
Bromoform	18	23	2	27	−6	20	57	16	65	14	80	11	84	11
Ethylbenzene	9	18	35	28	31	34	71	9	93	13	70	21	96	5
Average removal of all volatiles	7	—	24	—	14	—	48	—	84	—	68	—	86	—

Table 7—Concentrations of volatile organics in sludges.

Compound	Primary sludge		Waste activated sludge		Trickling filter sludge		Chemical sludge	
	μg/L	σ	μg/L	σ	μg/L	σ	μg/L	σ
Carbon tetrachloride	20	10	14	4	12	5	14	4
1,1 Dichloroethane	135	30	9	2	60	32	139	14
1,1 Dichloroethylene	156	38	13	12	47	38	181	63
Chloroform	126	35	12	4	60	42	149	30
1,2 Dichloroethane	128	25	24	19	77	30	127	59
Bromoform	27	13	18	4	15	4	25	16
Ethylbenzene	312	150	3	1	28	16	511	393

samples also showed a higher variability than duplicate analyses of the same sample. The average percent deviation for duplicate analyses of the same samples for all semivolatiles, excluding isophorone and the three phenolics, was 4%. The corresponding variability for analyses of samples collected in duplicate was 10%. The average percent deviations from mean for all semivolatiles except isophorone and the three phenolics in sludge samples were 9% for duplicate analyses and 18% for duplicate samples.

Table 8—Reproducibility of duplicate analyses of individual collected samples and analyses of samples collected in duplicate—semivolatiles.

Compound	Average % deviation from mean	
	Duplicate injections of 23 samples	Analyses of seven duplicate samples
Bis(2-ethylhexyl)phthalate	2	12
Dibutylphthalate	4	7
Naphthalene	1	12
Phenanthrene	6	15
Pyrene	2	4
Fluoranthene	2	2
Isophorone	14	15
Bis(2-chloroethyl)ether	7	16
p-Dichlorobenzene	7	9
Phenol	24	26
2,4 Dichlorophenol	36	42
Pentachlorophenol	14	10

Average concentrations of semivolatile priority pollutant organics in wastewater feed and process effluents are shown in Table 9. Table 10 shows the average percent removals of each semivolatile organic from 11 matched pairs of influent and effluent samples (and three matched pairs for lindane and heptachlor). The activated sludge system was clearly superior in semivolatile removal; except for lindane and heptachlor, removals exceeded 80%. The facultative lagoon ranked second; removals for 11 semivolatiles exceeded 70%. The aerated lagoon ranked third, and primary clarification produced the lowest overall removals.

Individual semivolatiles associated with the wastewater solids were removed effectively by those treatment processes that produced effluents with low suspended solids concentrations. Chemical clarification gave high removals of bis(2-ethylhexyl)phthalate, phenanthrene, pyrene, and fluoranthene. The primary plus filtration system gave somewhat lower removals of the same four compounds. Removals by the trickling filter system were comparable to those of the primary plus filtration system for this particular mix of semivolatiles.

Concentrations of semivolatiles and TSS in sludges are shown in Table 11. Unlike the volatile organics, the semivolatiles seem

Table 11—Concentrations of semivolatile organics and TSS in sludges.

Compound	Primary sludge		Waste activated sludge		Trickling filter sludge		Chemical sludge	
	µg/L	σ	µg/L	σ	µg/L	σ	µg/L	σ
Bis(2-ethylhexyl)phthalate	5 550	3 450	4 350	3 630	1 425	860	9 900	5 850
Dibutylphthalate	1 150	850	284	474	356	157	3 100	2 050
Naphthalene	620	490	29	26	230	66	1 180	715
Phenanthrene	2 850	2 010	184	165	820	304	5 925	3 425
Pyrene	4 000	2 750	366	254	1 140	620	8 550	4 575
Fluoranthene	4 000	2 950	337	226	1 040	525	8 250	4 350
Isophorone	70	34	19	6	106	52	84	76
Bis(2-chloroethyl)ether	129	81	115	68	262	115	152	62
p-Dichlorobenzene	580	515	36	17	169	80	1 150	740
Phenol	465	545	565	780	395	291	358	257
2,4 Dichlorophenol	199	102	ND[a]	ND[a]	483	225	464	569
Pentachlorophenol	119	69	110	131	174	145	1 175	1 260
Lindane	1 010	640	204	69	240	148	707	127
Heptachlor	1 180	208	658	201	383	116	1 967	208
TSS (mg/L)	19 850	8 550	6 625	1 035	2 250	1 250	18 600	8 375

[a] ND = Not detected.

Table 12—Concentrations of metals in wastewater feed and effluents.

Metal	Wastewater feed		Primary clarification		Trickling filter		Activated sludge		Aerated lagoon		Facultative lagoon	
	µg/L	σ	µg/L	σ	µg/L	σ	µg/L	σ	µg/L	σ	µg/L	σ
Cr	221	88	206	135	107	130	40	18	65	106	46	34
Cu	345	119	278	113	137	77	61	40	89	61	71	46
Ni	141	93	136	101	98	68	81	45	91	50	81	59
Pb	165	168	115	102	86	79	58	75	70	76	82	110
Cd	25	23	22	14	18	14	19	17	—	—	17	9

Table 13—Percent removal of metals by different processes.

Metal	Primary clarification	Trickling filter	Activated sludge	Aerated lagoon	Facultative lagoon
Cr	7	52	82	71	79
Cu	19	60	82	74	79
Ni	4	30	43	35	43
Pb	30	48	65	58	50
Cd	12	28	24	—	32

Table 14—Concentrations of metals in sludges.

Metal	Primary sludge		Waste activated sludge		Trickling filter sludge	
	mg/L	σ	mg/L	σ	mg/L	σ
Cr	15.6	6.9	12.8	13.6	5.6	4.6
Cu	23.5	9.2	14.9	12.6	7.0	4.8
Ni	5.2	2.9	3.5	2.8	2.0	1.6
Pb	10.1	4.6	5.3	4.6	2.7	2.4
Cd	0.6	0.5	0.4	0.5	0.2	0.1

SUMMARY

This research evaluated the capabilities of five less-than-secondary treatment processes for removal of priority pollutants, and determined how the organics partition and interact within the processes. A conventional activated sludge system was operated in parallel with the alternative processes to provide a control against which the alternative processes could be compared.

The control activated sludge process provided the best removals of both conventional pollutants and toxic priority pollutants. The facultative lagoon with its long detention time was the most successful alternative process. The aerated lagoon with

TABLE 3

TYPICAL POTW REMOVAL RATES
FOR INCOMPATIBLE POLLUTANTS

Toxic Pollutant	Percent Removal Through Primary Treatment	Percent Removal Through Primary and Secondary Units
	Median Value[1]	Median Value[2]
Cadmium	7	50
Chromium	16	71
Copper	18	82
Cyanide	--	56
Lead	20	57
Mercury	22	51
Nickel	6	32
Zinc	26	76

[1]Reference: (1)

[2]Reference: (2)

NEW CASTLE COUNTY

Joseph J. Freebery
General Manager

187-A Old Churchmans Road
New Castle, DE 19720

DEPARTMENT OF SPECIAL SERVICES
ENGINEERING AND ENVIRONMENTAL SERVICES DIVISION

October 1, 1997

John Lovell
USEPA Region III
841 Chestnut Building
Philadelphia, PA 19107

RE: NPDES Permit DE0050547
Local Limits

Dear Mr. Lovell:

Enclosed for your review and comments are proposed revisions to the local limits for the MOT service area. The current limits, which were revised in 1990, were re-evaluated based on the following:

1) Effluent limitations- the more stringent of
- a) Delaware DNREC Criteria
- b) DRBC Criteria
- c) SDWA MCLs

2) Current flow of 0.50 mgd consisting of
- a) 0.016 mgd industrial users
- b) 0.484 mgd non-industrial users

3) Removal efficiencies based on the MOT Water Farm facility, which began operation in August 1995. Where no data was available, removal efficiencies from Appendix L of the Guidance Manual for POTW Program Development and from the previous submission were used.

4) Sludge disposal was eliminated as a consideration in the calculation of influent concentration limits since it is not applicable to the MOT facility.

Phone: (302) 323-6400

Fax: (302) 323-6490

Pollutant	PRELIM5 Limit (mg/L)	Calculated Limit (mg/L)	Proposed Limit (mg/L)	Current Limit (mg/L)	
Aluminum	N/A	49	N/A	1.50	NO DOM
Arsenic	3.11	3.11	3.00	1.00	
Beryllium	0.25	0.22	0.20	0.007	NO DOM
Cadmium	0.53	0.53	0.50	0.02	
Chromium (T)	416	416	N/A	1.50	
Chromium, hex	1.67	1.67	1.50	0.50	NO DOM
Copper	3.12	3.12	3.00	0.15	
Cyanide	0.32	0.32	0.30	0.30	
Iron	308	308	N/A	N/A	
Lead	4.21	4.21	4.00	0.50	
Mercury	0.0028	0.0028	0.0025	0.001	
Molybdenum	0.20	0.20	0.20	N/A	
Nickel	10.17	10.17	10	0.02	
PCBs	0.17	N/A	N/A	0.0001	
Selenium	0.35	0.35	0.35	0.25	
Silver	0.003	0.015	0.015	0.015	
Thallium	0.11	0.11	0.10	5.00	NO DOM
Zinc	0.86	0.86	0.85	1.00	
Ammonia as Nitrogen	N/A	N/A	35.00	35.00	
Phenols	N/A	N/A	10.00	10.00	
BOD	N/A	N/A	500	350	
TSS	N/A	N/A	500	500	

difference caused by rounding in "calculated limit"

As noted in the above chart, the limits for aluminum and total chromium will be removed, as they have no practical significance. Additionally, the local limit for PCBs will be eliminated; PCB discharges may be permitted on a case by case basis. Ammonia and phenols limits but will remain at current levels for sewer safety. The TSS limit shall also remain unchanged. The limit for BOD shall increase to 500 mg/L, since the lagoon capacity allows for increased reduction of BOD.

The enclosed tables summarize analysis and calculations on which the evaluation of the limits is based. Concurrent with your review, we will initiate consultations with the Town of Middletown to facilitate adoption of the revised local limits.

Should you have any questions or require further information on the above, please contact Louise Melchor at 302-323-6410.

Very truly yours,

J.B. Asthana

J. B. Asthana, PhD, P.E.
Chief of Environmental Engineering

LM:
Encl.

cc: Paul Janiga, DE DNREC
Kenneth Branner, Town of Middletown

file:d:\mot\limsub

POLLUTANT

EFFLUENT

LIMITATIONS

Submitted 10/1/97

STANDARDS & CRITERIA

	Fish Ingestion (mg/L)(1)	Fresh Acute (mg/L)(2)	Fresh Chronic (mg/L)(2)	Chronic * 7.6 (mg/L)(2)	DRBC (mg/L)(3)	DNREC (mg/L)(4)	SDWA (mg/L)(5)
Ag	40	0.023	0.00012	**0.000912**	0.05	0.1	0.05
Al	N/A	0.75	0.087	**0.6612**			N/A
As	N/A	0.36	0.19	1.444	0.1		**0.05**
Be	3.5						**0.004**
Cd	N/A	**0.0123**	0.0025	0.019	0.02	0.1	**0.01**
Cr(VI)	4.2	**0.016**	0.011	0.0836	0.1	0.15	0.05
Cr(T)	N/A	4	0.672	5.1072			
Cu	N/A	**0.046**	0.04	0.304	0.2	0.5	1
CN	270	**0.022**	0.0052	0.03952		0.05	0.2
Fe	N/A	N/A	1	7.6		2	N/A
Pb	N/A	0.3	0.02	0.152	0.1	0.15	**0.05**
Hg	0.0071	0.0024	0.000012	**0.0000912**	0.01	0.005	0.002
Mo	N/A						N/A
Ni	5.7	3.34	0.532	4.0432		1	**0.1**
PCBs	**5.600000E-08**	0.002	0.000014	0.0001064			0.0005
Phen							N/A
Se	1.1	0.02	0.005	0.038	0.02	0.02	**0.01**
Th	0.06		N/A				**0.002**
Zn	N/A	**0.276**	0.358	2.7208	0.6	1	5

Bold indicates most stringent limitation for each pollutant

1) Limits from State of Delaware Water Quality Standards, Table 2, February 1990
2) Limits from State of Delaware Water Quality Standards, Table 1, February 1990. No dilution used for acute; 7.6:1 used for chronic. Ambient hardness = 275 for acute; 471 for chronic
3) Effluent Quality Requirements, 1994
4) "Regulations Governing the Control of Water Pollution" as amended June 30, 1993
5) MCLs

RESIDENTIAL/

COMMERCIAL

AVERAGES

NON-INDUSTRIAL CHARACTERISTICS

Pollutant	EPA Local Limits Guidance (1987) Typical Domestic Average Waste-water Level (mg/L)	Overall Average Pollutant Levels from EPA Supplement to Guidance (1991)(mg/L)	New Castle County Residential (mg/L)
Aluminum		N/A	N/A
Ammonia		43.111	N/A
Arsenic	0.003	0.007	0.0006
Barium		0.115	N/A
Beryllium		N/A	N/A
Cadmium	0.003	0.008	0.005
Chromium (VI)		N/A	N/A
Chromium (T)	0.05	0.034	0.013
Copper	0.061	0.109	0.081
Cyanide	0.041	0.082	N/A
Fluoride		0.255	N/A
Iron		0.989	N/A
Lead	0.049	0.116	0.01
Mercury	0.0003	0.002	0.0001
Molybdenum		N/A	0.0022
Nickel	0.021	0.047	0.072
PCBs		N/A	N/A
Phenols		0.01	N/A
Selenium		0.004	0.0015
Thallium		N/A	N/A
Zinc	0.175	0.212	0.11
Silver	0.004	0.019	N/A

Per page 1-12 of the EPA supplemental document, guidance averages have been used in the absence of actual site-specific data in the calculation of local limits for NCC.

New Castle County analytical data is comprised from samples taken from solely residential locations, in May 1997.

INDUSTRIAL

LOADINGS

LOADINGS (LB/DAY) FOR INDUSTRIAL USERS IN MOT SERVICE AREA

Johnson Controls	As	Cd	Cr	Cu	Pb	Hg	Mo	Ni	Se	Zn
July-Dec 1996	0.00014	0.00025	0.00061	0.00022	0.02115	0.00002	0.04280	0.00253	0.00008	0.00190
Jan-June 1996	0.00024	0.00034	0.00058	0.01800	0.02800	0.00016	0.01860	0.00217	0.00007	0.00710
July-Dec 1995	0.00012	0.00034	0.00062	0.00166	0.01780	0.00016	0.06220	0.00230	0.00008	0.00890
Jan-June 1995	0.00014	0.00059	0.00041	0.00110	0.01050	0.00001	0.04660	0.00124	0.00007	0.00320
July- Dec 1994	0.00011	0.00021	0.00042	0.00110	0.00910	0.00001	0.01200	0.00320	0.00006	0.00091
Jan-June 1994	0.00011	0.00026	0.00067	0.00120	0.01330	0.00001	0.03920	0.00250	0.00007	0.01900
July- Dec 1993		0.00020	0.00063	0.00210	0.01960			0.00210		0.00250
Average	0.00014	0.00031	0.00056	0.00363	0.01706	0.00006	0.03690	0.00229	0.00007	0.00622
Avg. (mg/L) (Flow = 0.0071mgd)	0.0017	0.0050	0.0100	0.0608	0.2890	0.0017	0.6230	0.0390	0.0017	0.1050

Mac Dermid Imaging	As	Cd	Cr	Cu	Pb	Hg	Mo	Ni	Se	Zn
July- Dec 1996	0.00017	0.00017	0.00051	0.00069	0.01711	0.00001	0.00089	0.00018	0.00017	0.02211
Jan-June 1996	0.00033	0.00033	0.00100	0.00074	0.00330	0.00001	0.00170	0.00017	0.00033	0.02190
July-Dec 1995	0.00016	0.00016	0.00140	0.00130	0.00480	0.00001	0.00240	0.00021	0.00048	0.04100
Jan-June 1995	0.00048	0.00048	0.00150	0.00140	0.00480	0.00001		0.00017	0.00048	0.02100
July- Dec 1994		0.00011	0.00002	0.00140	0.00520			0.00049		0.01800
Jan-June 1994					0.00250					0.00670
July- Dec 1993					0.00370					0.00960
Average	0.00029	0.00025	0.00089	0.00111	0.00592	0.00001	0.00166	0.00024	0.00037	0.02004
Avg. (mg/L) (Flow = 0.0036mgd)	0.0100	0.0100	0.0300	0.0370	0.1970	0.0003	0.0570	0.0067	0.0130	0.6700

Industrial flows were obtained from self-monitoring submissions.

REMOVAL

EFFICIENCY

DATA

MOT ANALYTICAL RESULTS

Influent

Sample Date	As (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Hg (mg/L)	Mo (mg/L)	Ni (mg/L)	Pb (mg/L)	Se (mg/L)	Zn (mg/L)	Fe (mg/L)
1/8/97	0.002	0.030	0.01	0.04	0.0002	0.021	0.02	0.02	0.002	0.08	1.54
1/15/97	0.002	0.024	0.06	0.06	0.0002	0.005	0.01	0.11	0.002	0.05	1.93
1/22/97	0.002	0.013	0.04	0.05	0.0002	0.005	0.01	0.20	0.002	0.12	4.32
1/28/97	0.002	0.028	0.09	0.07	0.0002	0.005	0.08	0.04	0.002	0.13	1.22
4/21/97	0.002	0.020	0.03	0.08	0.0002	0.080	0.04	0.04	0.002	0.11	1.60
4/28/97	0.002	0.020	0.78	0.10	0.0002	0.052	0.28	0.04	0.002	0.13	4.55
5/7/97	0.002	0.020	0.37	0.10	0.0002	0.032	0.19	0.02	0.002	0.13	4.96
5/15/97	0.002	0.020	0.03	0.03	0.0002	0.065	0.04	0.02	0.002	0.08	1.60
5/23/97	0.002	0.020	0.03	0.03	0.0002	0.032	0.04	0.03	0.002	0.07	1.91
Average	0.002	0.022	0.16	0.062	0.0002	0.033	0.078889	0.06	0.002	0.10	2.63

Effluent

Sample Date	As (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Hg (mg/L)	Mo (mg/L)	Ni (mg/L)	Pb (mg/L)	Se (mg/L)	Zn (mg/L)	Fe (mg/L)
11/13/96		0.02		0.04			0.07			0.25	
4/21/97	0.002	0.02	0.07	0.02	0.0002	0.039	0.04	0.02	0.002	0.36	0.89
4/28/97	0.002	0.02	0.08	0.02	0.0002	0.032	0.04	0.02	0.002	0.34	0.59
5/7/97	0.002	0.02	0.03	0.01	0.0004	0.067	0.04	0.02	0.002	0.03	0.07
5/15/97	0.002	0.02	0.03	0.01	0.0002	0.035	0.04	0.02	0.002	0.26	0.58
5/23/97	0.002	0.02	0.03	0.02	0.0002	0.019	0.04	0.02	0.002	0.04	0.30
Average	0.002	0.02	0.05	0.02	0.0002	0.038	0.04	0.02	0.002	0.206	0.486

MOT

LOCAL LIMITS

CALCULATIONS

1997 NON-DOMESTIC EFFLUENT LIMITS

Metal	Present Limits (mg/l)	Influent (mg/L)	Effluent (mg/L)	% Removal	Allowable Effluent Conc. (mg/L)	Allowable Influent Conc.(mg/l)	Total Influent Flow (MGD)	Industrial Influent Flow (MGD)	Domestic Flow (MGD)
Aluminum	1.50	N/A		* 58.0%	P 0.661	1.5743	0.5	0.016	0.484
Arsenic	1.00	0.002	0.001	** 50.0%	0.050	0.1000	0.5	0.016	0.484
Beryllium	0.007	N/A		* 50.0%	P 0.004	0.0070	0.5	0.016	0.484
Cadmium	0.02	0.022	0.010	** 53.9%	0.010	0.0217	0.5	0.016	0.484
Chromium (VI)	0.50	N/A		* 70.0%	0.016	0.0533	0.5	0.016	0.484
Chromium (T)	1.50	0.160	0.048	70.0%	4.000	13.3333	0.5	0.016	0.484
Copper	0.15	0.062	0.016	74.2%	0.046	0.1783	0.5	0.016	0.484
Cyanide	0.30	N/A		* 56.0%	LL 0.022	0.0500	0.5	0.016	0.484
Iron	N/A	2.626	0.486	81.5%	2.000	10.8066	0.5	0.016	0.484
Lead	0.50	0.058	0.020	** 65.4%	0.050	0.1445	0.5	0.016	0.484
Mercury	0.001	0.0001	0.0001	** 51.0%	LL 0.000	0.0002	0.5	0.016	0.484
Molybdenum	N/A	0.033	0.038	-16.4%	0.010 ?	0.0086	0.5	0.016	0.484
Nickel	0.02	0.079	0.020	** 74.7%	0.100	0.3950	0.5	0.016	0.484
Selenium	0.25	0.001	0.001	** 20.0%	0.010	0.0125	0.5	0.016	0.484
Silver	0.02	N/A		* 77.0%	0.001	0.0043	0.5	0.016	0.484
Thallium	5.00	N/A		* 44.0%	P 0.002	0.0036	0.5	0.016	0.484
Zinc	1.00	0.100	0.206	-106.0%	0.276	0.1340	0.5	0.016	0.484

Underlined values indicate parameter was below detection limit.

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1997 NON-DOMESTIC EFFLUENT LIMITS

Metal	Allowable Influent Conc. (mg/l)	Allowable Influent Load (lbs/day)	Domestic Concentration. (mg/l)	Domestic Load (lbs/day)	Allowable Industrial Load (lbs/day)	Allowable Industrial Conc. (mg/l)
Aluminum	1.574	6.565	0.0000	0.000	6.565	49.20
Arsenic	0.100	0.417	0.0006	0.002	0.415	3.11
Beryllium	0.007	0.029	0.0000	0.000	0.029	0.22
Cadmium	0.022	0.090	0.0050	0.020	0.070	0.53
Chromium (VI)	0.053	0.222	0.03 0.0000	0.000	0.222	1.67
Chromium (T)	13.333	55.600	0.0130	0.052	55.548	416.27
Copper	0.178	0.743	0.0810	0.327	0.416	3.12
Cyanide	0.050	0.209	0.0410	0.165	0.043	0.32
Iron	10.807	45.063	0.9890	3.992	41.071	307.79
Lead	0.145	0.603	0.0100	0.040	0.562	4.21
Mercury	0.000	0.001	0.0001	0.000	0.000	0.0028
Molybdenum	0.009	0.036	0.0022	0.009	0.027	0.20
Nickel	0.395	1.647	0.0720	0.291	1.357	10.17
Selenium	0.013	0.052	0.0015	0.006	0.046	0.35
Silver	0.004	0.018	0.0040	0.016	0.002	0.015
Thallium	0.004	0.015	0.0000	0.000	0.015	0.11
Zinc	0.134	0.559	0.1100	0.444	0.115	0.86

.0039652 0.0165348 0.0161 .0005348 0.0032583

PRELIM V.5.0

DATA SHEETS
&
REPORT

Data Sheet 1

PRELIM 5.0: FACILITY PROFILE

A. POTW NAME: [MOT Water Farm]

B. WASTEWATER UNIT OPERATIONS
(Put an 'X' where appropriate)
[ ] (1) Primary Clarification
[ ] (2) Activated Sludge
[ ] (2) Trickling Filter
[X] (2) Other Secondary
[ ] (3) Nitrification
[X] (3) Other Tertiary

C. PLANT FLOW INFORMATION

POTW Average Flow (mgd): [0.500]
Industrial Flow (mgd): [0.016]
Nonindustrial Flow (mgd): [0.484]
Sludge to Digester (mgd): [ ]

D. EFFLUENT DISPOSAL METHOD
(Put an 'X' where appropriate)
[X] Fresh [ ] Estuarine
[ ] Salt [ ] Other

E. RECEIVING WATER DILUTION
1Q10 Based: [ ] (upstream 1Q10 flow) x (% available) / (POTW flow)
7Q10 Based: [ ] (upstream 7Q10 flow) x (% available) / (POTW flow)

F. SLUDGE DIGESTION OPERATIONS
(Put an 'X' where appropriate)
[ ] Aerobic [ ] Other
[ ] Anaerobic

****

G. SLUDGE FLOW TO DISPOSAL	Quantity (mt/day)	Site Area (hectares)	Site Life (years)	AWSAR (mt/ha/yr)	Distance from Unit to Property Line (m)
Codisposal/Landfill:	[ ]				
Bulk Land Application (Agric,...):	[ ]	[ ]	[ ]		
Bulk Land Application (Lawn/Home):	[ ]				
Non-Bulk Land Application:	[ ]			[ ]	
Surface Disposal	[ ]				[ ]
Incineration	[ ]				
Other Disposal	[ ]				

H. SLUDGE INCINERATOR TYPE
(Put an 'X' where appropriate)
[ ] Fluidized Bed with Wet Scrubber
[ ] Fluidized Bed with Wet Scrubber and Wet Electrostatic Precipitator
[ ] Other types with Wet Scrubber
[ ] Other types with Wet Scrubber and Wet Electrostatic Precipitator

I. INCINERATOR DISPERSION FACTOR: [ ]

Data Sheet 2.1
POTW Name: MOT Water Farm

PRELIM 5.0 - STANDARDS AND CRITERIA

POLLUTANT	Average Influent Concentration (mg/l)	Average Nonindustrial Concentration (mg/l)	NPDES Effluent Limit (mg/l)	Background Concentration in Receiving Water (mg/l)	Chronic Water Quality Criterion/ Standard(mg/l)	Acute Water Quality Criterion/ Standard(mg/l)
Arsenic	0.002	0.0006			1.444	0.36
Beryllium						
Cadmium	0.022	0.005			0.019	0.0123
Chromium	0.160	0.013			5.1072	4
Chromium, hex					0.0836	0.016
Copper	0.062	0.081			0.304	0.046
Cyanide		0.041			0.03952	0.022
Iron	2.626	0.989			7.6	
Lead	0.058	0.01	0.15		0.152	0.3
Mercury	0.0001	0.0001			0.000091	0.0024
Molybdenum	0.033	0.0022				
Nickel	0.079	0.072			4.0432	3.34
PCBs		0			0.000106	0.002
Selenium	0.001	0.0015			0.038	0.02
Silver		0.004			0.000912	0.023
Thallium		0				
Zinc	0.100	0.110			2.7208	0.276

Data Sheet 2.2
POTW Name: MOT Water Farm

PRELIM 5.0 - STANDARDS AND CRITERIA

POLLUTANT	Other Water Quality Criterion/ Standard (mg/l)	Pollutant Level in Sludge to Digester (mg/l)	Pollutant Level in Sludge to Disposal (mg/kg)	Federal Land Application Ceiling Conc. (mg/kg)	Federal Cumulative Application Rate (kg/ha)	Federal Land Application Criterion (mg/kg)
Arsenic	0.05			75.0	41.0	41.0
Beryllium	0.004					
Cadmium	0.01			85.0	39.0	39.0
Chromium						
Chromium, hex						
Copper				4300.0	1500.0	1500.0
Cyanide						
Iron	2					
Lead	0.05			840.0	300.0	300.0
Mercury				57.0	17.0	17.0
Molybdenum	0.01			75.0		
Nickel	0.10			420.0	420.0	420.0
PCBs						
Selenium	0.01			100.0	100.0	100.0
Silver						
Thallium	0.002					
Zinc				7500.0	2800.0	2800.0

Data Sheet 2.3
POTW Name: MOT Water Farm

PRELIM 5.0 - STANDARDS AND CRITERIA

POLLUTANT	Federal Annual Application Rate (kg/ha/yr)	Federal Surface Disposal Criterion (mg/kg)	NESHAP (grams/day)	NAAQS Air Quality Std. or RSC value (ug/cubic m)	Incinerator Control Efficiency (%)	State Sludge Cumulative Application Rate (kg/ha)
Arsenic	2.0	30		0.023		
Beryllium			10.0			
Cadmium	1.9			0.057		
Chromium		200				
Chromium, hex						
Copper	75.0					
Cyanide						
Iron						
Lead	15.0			1.5		
Mercury	0.85		3200			
Molybdenum						
Nickel	21.0	210		2.0		
PCBs						
Selenium	5.0					
Silver						
Thallium						
Zinc	140.0					

Data Sheet 2.4
POTW Name: MOT Water Farm

PRELIM 5.0 - STANDARDS AND CRITERIA

POLLUTANT	State Sludge Annual Application Rate (kg/ha/yr)	Other State Sludge Criterion (mg/kg)	State Incinerator Emission Limit (grams/day)	Activated Sludge Inhibition Criteria (mg/l)	Trickling Filter, RBC Inhibition Criteria (mg/l)	Other Secondary Inhibition Criteria (mg/l)
Arsenic						
Beryllium						
Cadmium						
Chromium						
Chromium, hex						
Copper						
Cyanide						
Iron						
Lead						
Mercury						
Molybdenum						
Nickel						
PCBs						
Selenium						
Silver						
Thallium						
Zinc						

Data Sheet 2.5
POTW Name: MOT Water Farm

PRELIM 5.0 - STANDARDS AND CRITERIA

POLLUTANT	Nitrification Inhibition Criteria (mg/l)	Other Tertiary Inhibition Criteria (mg/l)	Aerobic Digester Inhibition Criteria (mg/l)	Anaerobic Digester Inhibition Criteria (mg/l)	Other Digester Inhibition Criteria (mg/l)	Removal Efficiency Through Primary (%)
Arsenic						
Beryllium						
Cadmium						
Chromium						
Chromium, hex						
Copper						
Cyanide						
Iron						
Lead						
Mercury						
Molybdenum						
Nickel						
PCBs						
Selenium						
Silver						
Thallium						
Zinc						

Data Sheet 2.6
POTW Name: MOT Water Farm

PRELIM 5.0 - STANDARDS AND CRITERIA

POLLUTANT	Removal Efficiency Through Secondary (%)	Plant Removal Efficiency (Pass-Through) (%)	Plant Removal Efficiency (Sludge) (%)	Safety Factor (%)		
Arsenic		50				
Beryllium		50				
Cadmium		53.9				
Chromium		70				
Chromium, hex		70				
Copper		74.2				
Cyanide		56				
Iron		81.5				
Lead		65.4				
Mercury		51				
Molybdenum		-16.4				
Nickel		74.7				
PCBs		98				
Selenium		20				
Silver		77				
Thallium		44				
Zinc		-106				

Data Sheet 3
POTW Name: MOT Water Farm

PRELIM 5.0: REMOVAL EFFICIENCY DATA

POLLUTANT	Date: 04/21/97 Flow (mgd): 0.50			Date: 04/28/97 Flow (mgd): 0.50			Date: 05/07/97 Flow (mgd): 0.50			Date: 05/15/97 Flow (mgd): 0.50		
	Total Removal%	Influent (mg/l)	Effluent (mg/l)	Total Removal%	Influent (mg/l)	Effluent (mg/l)	Total Removal%	Influent (mg/l)	Effluent (mg/l)	Total Removal%	Influent (mg/l)	Effluent (mg/l)
Arsenic		0.001	0.001		0.001	0.001		0.002	0.001		0.001	0.001
Beryllium												
Cadmium		0.01	0.01		0.01	0.01		0.01	0.01		0.01	0.01
Chromium		0.015	0.07		0.78	0.08		0.37	0.015		0.015	0.015
Chromium, hex												
Copper		0.08	0.02		0.10	0.02		0.10	0.005		0.03	0.005
Cyanide												
Iron		1.6	0.89		4.55	0.59		4.96	0.58		1.6	0.58
Lead		0.04	0.01		0.04	0.01		0.01	0.01		0.01	0.01
Mercury		0.0001	0.0001		0.0001	0.0001		0.0001	0.0004		0.0001	0.0001
Molybdenum		0.08	0.039		0.052	0.032		0.032	0.067		0.065	0.035
Nickel		0.02	0.02		0.28	0.02		0.19	0.02		0.02	0.02
PCBs												
Selenium		0.001	0.001		0.001	0.001		0.001	0.001		0.001	0.001
Silver												
Thallium												
Zinc		0.11	0.36		0.13	0.34		0.13	0.03		0.08	0.26

Data Sheet 3
POTW Name: MOT Water Farm

PRELIM 5.0: REMOVAL EFFICIENCY DATA

POLLUTANT	Date: 05/23/97 Flow (mgd): 0.50 Total Removal%	Influent (mg/l)	Effluent (mg/l)	Date: Flow (mgd): Total Removal%	Influent (mg/l)	Effluent (mg/l)	Date: Flow (mgd): Total Removal%	Influent (mg/l)	Effluent (mg/l)	Date: Flow (mgd): Total Removal%	Influent (mg/l)	Effluent (mg/l)
Arsenic		0.001	0.001									
Beryllium												
Cadmium		0.01	0.01									
Chromium		0.015	0.015									
Chromium, hex												
Copper		0.03	0.02									
Cyanide												
Iron		1.91	0.3									
Lead		0.03	0.015									
Mercury		0.0001	0.0001									
Molybdenum		0.032	0.019									
Nickel		0.02	0.02									
PCBs												
Selenium		0.001	0.001									
Silver												
Thallium												
Zinc		0.07	0.04									

Data Sheet 4
POTW Name: MOT Water Farm

PRELIM 5.0: INDUSTRIAL USER DATA

	IU: Johnson Contr Flow: 0.008		IU: MacDermid Ima Flow: 0.008		IU: Flow:		IU: Flow:		IU: Flow:	
POLLUTANT	Average Effluent (mg/l)	Selected Removal (%)	Average Effluent (mg/l)	Selected Removal (%)	Average Effluent (mg/l)	Selected Removal (%)	Average Effluent (mg/l)	Selected Removal (%)	Average Effluent (mg/l)	Selected Removal (%)
Arsenic	0.0017		0.01							
Beryllium										
Cadmium	0.005		0.01							
Chromium	0.01		0.03							
Chromium, hex										
Copper	0.0608		0.037							
Cyanide										
Iron										
Lead	0.289		0.197							
Mercury	0.0017		0.0003							
Molybdenum	0.623		0.057							
Nickel	0.039		0.0067							
PCBs										
Selenium	0.0017		0.013							
Silver										
Thallium										
Zinc	0.105		0.67							

UNIFORM CONCENTRATION INDUSTRIAL EFFLUENT LIMITS (mg/l)

(APPLIED TO NON-DOMESTIC FLOW ONLY)

POTW Name: MOT Water Farm

POLLUTANT	Using Total Industrial Flow	Using Industrial Contributory Flow	Contributory * Flow (MGD)	Basis in Derivation of Limit
Arsenic	3.1069	3.1069	0.0160	PASS THROUGH
Beryllium	0.2500	10000000.0000	0.0000	PASS THROUGH
Cadmium	0.5266	0.5266	0.0160	PASS THROUGH
Chromium	416.2734	416.2734	0.0160	PASS THROUGH
Chromium, hex	1.6667	10000000.0000	0.0000	PASS THROUGH
Copper	3.1215	3.1215	0.0160	PASS THROUGH
Cyanide	0.3222	10000000.0000	0.0000	PASS THROUGH
Iron	307.9206	10000000.0000	0.0000	PASS THROUGH
Lead	4.2134	4.2134	0.0160	PASS THROUGH
Mercury	0.0028	0.0028	0.0160	PASS THROUGH
Molybdenum	0.2019	0.2019	0.0160	PASS THROUGH
Nickel	10.1738	10.1738	0.0160	PASS THROUGH
PCBs	0.1656	10000000.0000	0.0000	PASS THROUGH
Selenium	0.3453	0.3453	0.0160	PASS THROUGH
Silver	0.0029	10000000.0000	0.0000	PASS THROUGH
Thallium	0.1116	10000000.0000	0.0000	PASS THROUGH
Zinc	0.8594	0.8594	0.0160	PASS THROUGH

* - Industry contributory flow is defined as total flow from those industries contributing the specific pollutant.